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REVISION OF SOUTH AMERICAN *SAURAUIA* (ACTINIDIACEAE)

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INTRODUCTION[1]

The genus *Saurauia,* founded by Willdenow in 1801, has about 280 species (Melchior, 1964) represented in both tropical and subtropical Asia and America. In the Americas, *Saurauia* is found from Central Mexico in the north to Bolivia in the south, through Andean South America.

Scientific interest in this genus has been almost exclusively taxonomic and has consisted largely of descriptive accounts of new species as they were discovered. In 1966 Hunter published a revision of the Mexican and Central American members of the genus in which 22 species were recognized. Prior to Hunter's work, there had been only one revisional treatment of the American *Saurauia,* namely that of Buscalioni and Muscatello, which was published serially in *Malpighia,* vols. 24-30, between 1912 and 1927, and in 1927 published in a single volume under the title of "Studio monografico sulle species americane del genero 'Saurauia' Willd." Unfortunately, this work lacks good organization and consistency in presentation, contains many errors in spelling of names and places, and has been criticized by workers of tropical American floras (Standley and Steyermark, 1949; Macbride, 1956).

Because of the absence of a standard taxonomic work on which reliable identification of South American *Saurauia* can be made, it was considered urgent to re-study the South American Group by examining the type specimens, specimens examined by Buscalioni and Muscatello, and other recent collections. Herbarium studies have been supplemented, in part, by field work in several parts of Colombia, Ecuador, and Peru during the summers of 1963-1966. Nevertheless, more extensive field work is needed because many

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species are still known only from a few herbarium collections. In a sense, the present work is a sequel of Hunter's 1966 revision of the Mexican and Central American species.

The institutions listed below have loaned specimens of *Saurauia* for study. The realization of this work would not have been possible without their generosity and it is acknowledged here with gratitude. Citation of the institution follows the standardized herbarium abbreviations according to Holmgren and Keuken (1974) wherever possible.

A	Arnold Arboretum, Harvard University, Cambridge, Mass.
B	Botanisches Museum, Berlin, Germany.
BM	British Museum of Natural History, London, England.
COL	Instituto de Ciencias Naturales, Universidad Nacional, Bogota, Colombia.
ECON	Economic Herbarium of Oakes Ames, Harvard University, Cambridge, Mass.
F	Field Museum of Natural History, Chicago, Illinois.
FI	Herbarium Universitatis Florentinae, Instituto Botanico, Firenze, Italy.
G	Conservatoire et Jardin Botaniques, Geneva, Switzerland.
GH	Gray Herbarium, Harvard University, Cambridge, Mass.
HAL	Institut für Systematische Botanik und Pflanzengeographie der Martin-Luther-Universität, Halle, Germany.
K	The Herbarium and Library, Royal Botanic Gardens, Kew, England.
L	Rijksherbarium, Leiden, Netherlands.
MA	Instituto "Antonio José Cavanilles," Jardin Botanico, Madrid, Spain.
MEDEL	Herbario de la Facultad Nacional de Agronomia, Medellin, Colombia.
MICH	University Herbarium, University of Michigan, Ann Arbor, Michigan.
NY	The New York Botanical Garden, New York, New York.
P	Museum National d'Histoire Naturelle, Laboratoire de Phanerogamie, Paris, France.
PASTO	Instituto Tecnologico Agricola, Universidad de Nariño, Pasto, Colombia.

S	Department of Botany, Naturhistoriska Riksmuseum, Stockholm, Sweden.
UC	Herbarium of the University of California, Berkeley, California.
US	United States National Museum, Department of Botany, Smithsonian Institution, Washington, D.C.
USM	Herbario San Marcos, Museo de Historia Natural, Lima, Peru.
UV	Departamento de Biologia, Universidad del Valle, Cali, Colombia.
VEN	Instituto Botanico, Caracas, Venezuela.
Z	Botanischer Garten und Institut für Systematische Botanik der Universität Zürich, Zürich, Switzerland.

History and Orthography

The generic name *Saurauia* was established by Willdenow in 1801, with a single species, *Saurauia excelsa* Willd., based upon specimens collected by Franz Bredemeyer in Caracas, Venezuela. Bredemeyer, the Prussian Kaiser's chief gardener, was sent abroad on several botanical expeditions to collect plants for the spring garden of the emperor. Two of these expeditions were to the Americas between 1783 and 1788, under the auspices of Kaiser Joseph II. The first, in 1783, was carried out in less than one year. The second, begun in 1783, lasted until 1788. Among other regions, Bredemeyer visited the Caribbean Islands and Venezuela. He stayed in Caracas for two years. Bredemeyer took both living and dried plant specimens back to Germany and many were forwarded to Willdenow, who studied them. Willdenow proposed the name *Saurauia* to honor the private adviser of the emperor, Franz Graf von Saurau, who patronized Willdenow's work. Von Saurau was also known as a friend and supporter of the natural sciences (Wittstein, 1852).

In the past, two orthographies were in use, *Saurauja* and *Saurauia*, partly because in the original Willdenow (1801) paper both spellings were used (*Saurauja* for the species heading, once, and *Saurauïa* for the legend of the plate, also once) and partly because of an error of W. J. Hooker (1842) who, in a footnote, mentioned that *Saurauja* was "so named by Willdenow in compliment to some botanist of the name of Sauraujo, but who is otherwise unknown to fame." Between 1801 and 1934, most botanists used the orthography *Saurauja,* but Gilg (1895) and Gilg and Werdermann

(1925) noted that Willdenow consistently annotated the herbarium specimens as *Saurauïa,* which was later conserved in the illustration. The diaeresis was used to connect the two vowels, so that the name should be pronounced *Sau-rau-i-a.* Between 1895 and 1934, some botanists began to use and accept the orthography *Saurauia,* and since 1934 only this orthography has been in use (Buscalioni and Muscatello, 1912-1927; Sleumer, 1934, 1938, 1941; Diels, 1937; Schultes, 1943-1963; Steyermark, 1952; Macbride, 1956; Hunter, 1966; Soejarto, 1968, 1969a, b, 1970).

In 1968, Paclt proposed to revert to the spelling *Saurauja,* but this proposal was rejected in the 1970 Seattle Congress (Stafleu, 1970). Upon Paclt's (1971) insistence and following Nicolson's (Nicolson and Brooks, 1974) proposal, the 1974 Leningrad Congress accepted the spelling *Saurauja,* which will become mandatory.

In view of the fact that the orthography *Saurauia* has been more widely used by modern taxonomists (in South America alone 51 taxa have been described under this name between 1912 and 1971, as against only 31 described between 1855 and 1934 under *Saurauja*), the orthography *Saurauia* is used in the present revision. It seems that conservation of *Saurauia* over *Saurauja* will solve the problem, since a reversal to the old orthography *(Saurauja)* will cause confusion and inconvenience (cf. Hoogland et al., 1977).

Morphological and Taxonomic Criteria

1. Habit

Members of South American *Saurauia* are mostly woody shrubs and small trees. Several species, however, may attain 30 m. or more in height, with a bole of up to 40 cm. in diameter at base. Taxonomically, plant habit is of little importance.

2. Leaves

The leaves of *Saurauia* are arranged in a 2:5 phyllotaxy, and in most species they are crowded around to clustered behind the tip of the branchlets, with internodes barely discernible. In several species, however, the leaves are distributed from the tip of to low along the branchlets, with the internodes prominent and well-defined, and this character has been used principally in the recognition of the Series **Omichlophilae.**

The shape of the leaf blade varies little, from obovate to elliptic or elliptic-oblong, hence it is a poor taxonomic character. The same is true of the leaf apex and base, although the leaf apex in *S. isoxan-*

thotricha, which is caudate with acumen up to 4.5 cm. long, and the leaf base in *S. spinuligera,* which is truncate to subcordate, are rare exceptions.

In several species, the leaf margins at base bend abruptly upward in the direction of the apex, on the upper leaf surface, and fuse with the midrib, and among themselves (at their tips) at a short distance above the leaf base, to form a boat-shaped structure, the so-called "basal flap" (Schultes, 1963b). This was thought to be an important taxonomic character. Field work, however, indicated that such a flap, which may be complete or incomplete, depending on the degree of fusion, can be found within a species population and, moreover, flap- and non-flap-bearing leaves may be found in the same tree, indicating that the character has no taxonomic significance. The function of the basal flap is not clear, since examination showed that none is associated with insect habitation (cf. *S. aromatica*).

Leaf margins are mostly serrulate to rarely serrate, while subentire margins represent a variant of distantly serrulate ones. Leaves with entire margins are not represented, but denticulate or double-serrated margins may be found. Usually, leaf margins are of little taxonomic importance.

Venation of the leaves is penninerved and the number of lateral or secondary veins, which ranges from 5 to 40 pairs, is a useful taxonomic character. In most species, the tertiary veins jut out from the lower leaf surface and are more prominent than the lesser venation ("lesser reticulum," see Hunter, 1966), while in others they are immersed and scarcely distinguished from or scarcely more prominent than the lesser venation. This character is important in grouping the species into series.

Undoubtedly, the types of trichomes and pubescence, in particular those on the lower surface of the leaf blade, are very important taxonomic characters. In this respect, members of the South American group have the same general trichome types and pubescence as those from Mexico and Central America, for which Hunter (1966) has proposed terminology, adopted in the present revision.

3. Inflorescence

The inflorescence of *Saurauia* is basically a thyrse and is axillary in position. A great number of the South American species have many-branched and many-flowered inflorescences (with up to 500 flowers per inflorescence), but few have little branched and few-

flowered inflorescences (as few as three flowers in *S. omichlophila*). In addition to this character, inflorescence size and pubescence are useful for identification.

The bracts and bracteoles may be foliaceous, linear, triangular or subulate. With the exception of *S. pedunculariis,* the presence of foliaceous bracts is not a constant feature among members of the South American *Saurauia*.

4. **Flower**

Usually, the flowers of *Saurauia* are described as bisexual and sometimes as polygamo-dioecious. Field and herbarium studies showed, however, that they should be described as functionally dioecious (Soejarto, 1969a).

Floral parts are normally pentamerous, including the androecium (Brown, 1935). However, irregular repetition of the floral parts is not uncommon among the South American species, where sextamery, heptamery, and even octamery of the calyx, corolla, and gynoecium are found in the same inflorescence, although in such cases the pentamerous flowers always predominate. An exception is the tetramerous condition of the perianth parts and the gynoecium of *S. yasicae,* where this feature is constant and is a good taxonomic character.

The size of the flowers vary from less than 10 mm. to 50 mm. broad at anthesis. Though interspecific variation is more or less continuous, flower size is often useful for plant identification.

The pubescence of the sepals is an important taxonomic character. Among the South American species, there are almost as many species with glabrous to glabrescent sepals as those with pubescent sepals. The greater number of the species in the Series **Omichlophilae**, **Laevigatae**, and **Parviflorae** have glabrous to glabrescent sepals, whereas all members of the Series **Pulverulentae**, **Macrophyllae**, and **Lanatae** have pubescent sepals which are glabrous on the inner surface, others pubescent throughout, and still others with sepals only partially pubescent, usually on the upper half. Further, subdivisions may be distinguished on the basis of the distribution of pubescence over the outer surface. This may be (1) glabrous, (2) pubescent on the parts exposed and glabrous on the parts covered (imbricated) in bud, (3) glabrous on the parts exposed and pubescent on the parts imbricated in bud, and (4) two kinds of pubescence may be present on the parts exposed in bud, in which case the parts imbricated may be either glabrous or pubescent.

In addition to pubescence, the types of the trichomes on the sepals contribute further to the classification of the species. Those occurring inside (on the inner surface) and on the outer imbricated surface in bud are also present on the outer surfaces exposed in bud when the vestiture is heterotrichous (of two or more types of trichomes). Sericeous, strigose, hirsute, and shaggy trichome types may occur on the exposed surfaces in bud.

The sepals are persistent and the base fused. The margins and apex are usually ciliolate to ciliate, rarely subentire. In contrast, the petals, which are free for most of their length but fused at base, fall as a unit with the stamens, after anthesis. As a result, many flowers have been described as "unisexual" or "male" and "female" when examined after anthesis. In all species studied, the petals are glabrous and in the great majority the color is white. Usually, the petals are larger than the sepals.

In *Saurauia* the stamens are free for most of their length, and in the South American species the number varies from 13 to 240 per flower. Variable as it is, stamen number is a convenient diagnostic feature, though tedious to record (Soejarto, 1969a). The filament is filiform and its length varies from 1.5 to 4.5 mm. The length of the filament may be a useful taxonomic character as an aid to identification, as is also the size of the anther, which varies from 1 to 4 mm., depending on the species. The shape of the anther is usually linear, but it is obcordate in the species with small flowers.

5. **Fruit**

The fruit of *Saurauia*, which is a berry, is green when fresh, even when mature, the rind fleshy and glossy. It may split upon handling, but the septae do not separate from the central column. Fruit size and characteristics are not of taxonomic importance.

6. **Cytology**

Chromosome counts of 15 species from South America showed that chromosome number may be of little importance in the taxonomy of the genus (Soejarto, 1970). In all the species investigated, it was found that the gametic chromosome number (n) equals 30.

7. **Species grouping**

Seven series are recognized to comprise the South American species. Of the 49 species accepted, only *S. yasicae* definitely extends to Central America and Mexico. The pubescent ovary of *S.*

loeseneriana justifies its inclusion in the Series **Gynotrichae**, also represented in Central America (Hunter, 1966).

Ecology, Geography, and Paleobotany

Species of *Saurauia* are characteristically adapted to humid or wet habitats, such as near waterfalls, along streams, in gullies and ravines, along river banks, in the humid mountain and rainforest areas, in mossy forests, and in cloud-covered regions. Some species prefer shady and misty habitats, while others prefer sunlit places. Among the South American species, there are more adapted to high elevations (over 1,500 m. altitude) than to lower elevations (below 1,500 m.), and there are more species found in undisturbed habitats than in disturbed habitats. Although plants often grow in pastures, on open hillsides, along roadsides, in sugarcane plantations, in second-growth vegetation, and even in gardens, the chances are that these plants were part of the natural vegetation found in the area and have been left behind deliberately during forest clearing, and that diligent search will show that members of the species are still found growing in their natural environment. Many species grow on sandy soil, others on rich humus and loamy soil, more rarely on rocky and lateritic soil. The highest altitude which members of South American *Saurauia* tolerate is 3,600 m., represented by *S. bullosa,* and the lower limit is almost at sea level, represented by *S. pseudoleucocarpa, S. parviflora, S. mexiae,* and *S. yasicae.* While most species from lower altitudes are glabrescent or sparingly pubescent, those from high altitudes may be glabrescent or densely pubescent. Species with chartaceous leaves and those with coriaceous to strongly coriaceous leaves are found both in low as well as in high altitudes.

As a result of the altitudinal pattern of distribution, the geographical range of the South American species is limited to the Andean mountain system, from Venezuela in the north to Bolivia in the south. No species are represented in the "puna" vegetation of Peru and Bolivia.

A careful examination of the ecological map of Colombia (Espinal and Montenegro, 1963), which is based upon the Holdridge system, shows that the distribution pattern for the majority of the Colombian species follows closely that of the vegetation types known as humid to wet submountain and mountain (montane, see Smith and Johnston, 1945) forests and subparamo (subalpine vegetation), with a mean annual rainfall of 1,000-4,000 mm. and a mean annual temperature

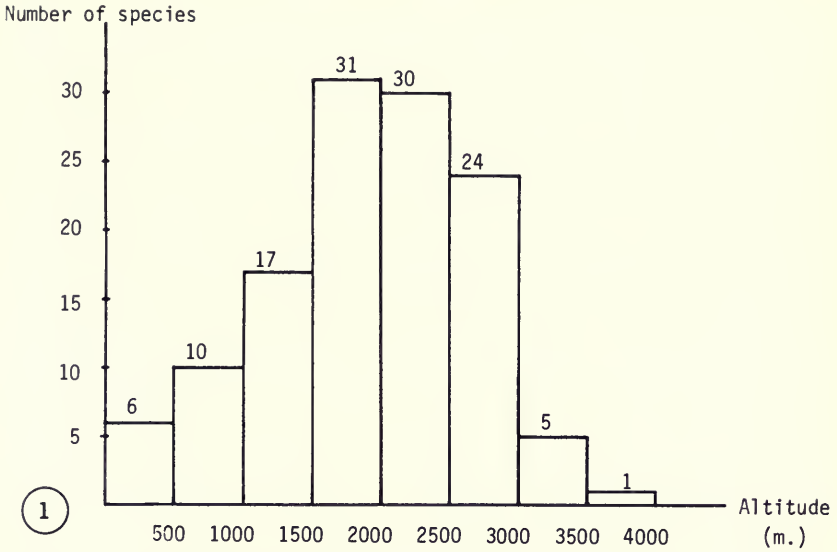

FIG. 1. Altitudinal distribution of South American *Saurauia*.(68.5 per cent of the species are found at altitudes of 1,500-3,000 m.)

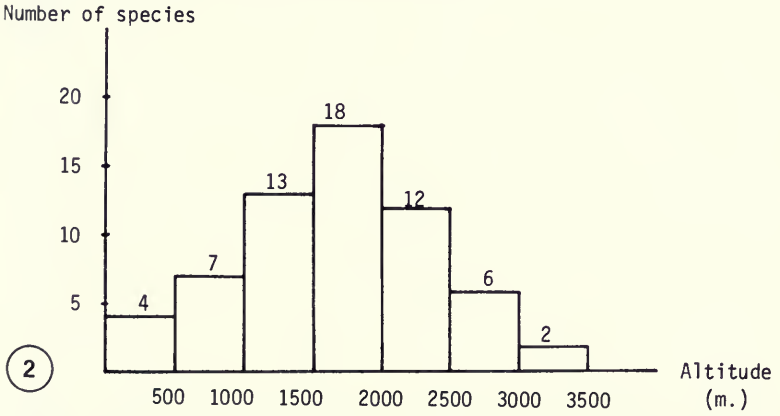

FIG. 2. Altitudinal distribution of Mexican and Central American *Saurauia*. (69.3 per cent of the species are found at altitudes of 1,000-2,500 m.)

of (8-) 10-20 (-24)°C. Records of meteorological observations (1954-1961) from several stations in Nariño and Putumayo, deposited at the Geographic Institute of Agustin Codazzi in Bogota (Colombia), confirm the rainfall and temperature ranges cited above. A histogram of altitude classes shows that 1,500-3,000 m. represents the optimal altitude range for the South American species (fig. 1). Similarly, a

histogram constructed for the Mexican and Central American species (fig. 2) shows that the optimal altitude range is 1,000-1,500 m. The higher optimal range for the South American species is due to the telescoping effect of the equator.

A strong species concentration is located near the Colombo-Ecuadorian frontier (the Nariño-Putumayo region), just before the Andes splits into the three Colombian Cordillera systems, i.e., the Occidental, Central, and Oriental. The great concentration of species in this region is due, probably, to the rugged nature of the topography and to the diverse types of habitats available which have permitted a faster rate of speciation. In a rough sketch, such diversity is represented by the complex "nudos de los pastos" with their peaks (above 4,000 m.) and ridges and the superandean plane and valleys in between, the subalpine and alpine vegetations, the western and eastern forested slopes, and the coastal zone with its tropical rain forest and mangrove swamps. At least 12 species are found in this region, of which six are restricted to the area.

Another high species concentration is located in the Choco-Caldas-Antioquia region of Colombia, where the western and central cordilleras, which are narrowly separated by the Cauca River valley, almost meet. The isolation of these two cordilleras may be considered incomplete in this part of Colombia. At least 16 species are found here, but only four of these *(S. spinuligera, schultesiana, laevigata, strigillosa)* are restricted to the area. It appears that the Choco-Caldas-Antioquia triangle is not a center of speciation, but rather a melting pot between the western and central cordilleras.

On the basis of the present data, the distribution of the species of *Saurauia* in the Andean countries can be summarized as follows:

Country	Number of Species	Endemic species
Venezuela	6	1
Colombia	29	22
Ecuador	12	7
Peru	11	5
Bolivia	5	3

The high number of species and endemism in Colombia is expected, and is believed to be the product of a more rapid rate of speciation, brought about by the existing diversity of physical conditions, created through the ramification of the Andes. The valleys of the Magdalena and Cauca rivers, which run parallel in a north-south direction, provide ideal lowland barriers to isolate populations of

Saurauia, and it is apparent that the ridges and slopes have provided routes of migration. The low number of species found in Peru and Ecuador may be deceiving, however, since this may be due to the lack of botanical explorations, a condition apparent from the herbarium representation. Further field work in these areas may turn up new records and, perhaps, new taxa.

Central and South America are separated by a lowland barrier starting at the isthmus of Panama, extending southward to northwestern Colombia. The only species known, beyond any doubt, to occur in both Central and South America is *Saurauia yasicae*. It is suspected that *S. brachybotrys* may also be represented in Mexico and Central America, where it may be known as *S. aspera* (see *Galeotti 7235*). That no species are known from the Antilles may be accounted for by the lack of obvious mechanisms for long-distance dispersal (Hunter, 1966; Soejarto, 1969a), whereas their absence in the Guiana highlands and in the highlands of Brazil may be due to the arid conditions which prevail on these plateaus. In addition, the great savannas of the Orinoco in the north and the Gran Chaco in the south effectively isolate these highlands from the Andes. Further south, frost limits the distribution of *Saurauia,* as is also true at altitudes above 3,600 m.

In its global aspect, the present-day distribution of the genus goes as far north as the Tropic of Cancer, and as far south as the Tropic of Capricorn. In Asia, where it is distributed from India to the Fiji, the number of species (over 170) is greater than that in the Americas (71). A similar disjunct distribution is known for many other genera of flowering plants (Good, 1953; van Steenis, 1962; Thorne, 1972), and it is well established that genera with such a discontinuous pattern of distribution (amphi-Pacific tropical) represent survivors of once extant arcto-tertiary (boreotropical) flora, which has failed to survive in Eurasia and North America (Raven and Axelrod, 1974; Wolfe, 1975). Unfortunately, paleobotanical evidence is inconclusive with regard to *Saurauia*.

Three mentions of fossil *Saurauia* have been made, all of them based on vegetative organs (leaves). Hollick (1936) described a leaf impression from the Eocene deposits of the Kupreanof Island (Hamilton Bay) of Alaska as *S. alaskana*. The identification of the specimen was made by comparing it with photographs of other fossil *Saurauia* from Europe, and not with recent collections. Hunter (1966) raises serious doubt as to the validity of such identification,

and, in addition, he questions whether the following characters which appear in Hollick's photograph are referrable to *Saurauia*: (1) the rounded apex, and (2) the tertiary veins, which are perpendicular to the midrib. Of the five species from Mexico and Central America (incl. *S. yasicae*) with tertiary veins perpendicular to the midrib, all have immersed tertiary veins, and none of the Mexican and Central American species has leaves with rounded leaf apex. Among the South American species, the prominent tertiary veins of some, e.g., *S. excelsa* and *S. multinervis,* tend to be perpendicular to the midrib nearest to the apex, and, in particular, the prominent tertiary veins of *S. micayensis* become perpendicular to the midrib on the upper half of the leaf blade. To be sure, all South American species have either an acute, acuminate, or, rarely, a caudate leaf apex, but a rounded apex is within the range of variation of *S. arnoldi, S. yasicae,* and *S. pulchra.* Furthermore, the acuminate apex of obovate leaves may be broken during handling as to give the apex a rounded appearance. The leaf margins in several species, notable in *S. yasicae* and *S. laevigata,* also tend to be somewhat entire in the lower half of the blade. While all these indicate that the leaf characters described as *S. alaskana* may be within the range of variation of *Saurauia*, this identification must be accepted with reservation. As Hollick himself stated, he was actually uncertain as to whether the specimen should be referred to *Saurauia*, *Juglans,* or *Hickoria,* especially the latter. *Ficus alkalina* Lesq. (1883), referred to by Hollick as resembling his specimen, appears to match better the leaf of *Saurauia*, notably *S. yasicae.* At any event, the evidence for the presence of fossil *Saurauia* in the New World is not definite.

In 1870 Ettinghausen described *S. deformis* from a leaf impression of the Tertiary of Croatia, which was earlier described by Unger as *Juglans deformis.* Ettinghausen referred the specimen as suggestive of certain Mexican species, but Hunter (1966) refuted this reference. More notable, however, is the leaf impression from the Tertiary (Eocene) formation of Sezanne, France, described by Langeron (1900) as *S. roborans.* Langeron indicated that the leaf impression resembles the leaves of *S. tristyla*, an Asian (Indonesian) species.

A collection of clay seeds from the upper Eocene flora of Hordle, Hants (Great Britain) was described by Chandler (1926) as *Actinidia crassisperma.* These seeds, as illustrated by Chandler, may very well be the seeds of *Saurauia*, since there is little difference between the seeds of the two genera.

In the light of recent paleobotanical evidence and interpretation (Graham, 1972; Wolfe, 1972, 1975), which (1) support the relationship between the Eocene floras of Europe and western North America, and (2) establish that the present Indomalayan flora represents a relict of the once widespread northern hemisphere tropical flora, it is safe to say that *Saurauia* may have indeed lived in Europe and western North America during the Tertiary. In the Americas, climatic deterioration during the Oligocene may have forced *Saurauia* populations to migrate southward. However, the arrival of *Saurauia* in South America probably did not take place until after the Central American land bridge (the Panama isthmus) was well established in the Pliocene, about 5.7 million years before present (Simpson, 1950; Lloyd, 1963; Emiliani et al., 1972; Heezen et al., 1973).

Economic Uses

1. **Fruit.** The fruit of *Saurauia* is a berry filled with numerous small seeds embedded in a mucilaginous pulp. When a fruit is mature, this mucilage is clear, somewhat sticky and sweet. Standley and Steyermark (1949) noted that the "pulp is very thin and in consistency much like the white of a raw egg." The natives around Pasto (Colombia) collect the fruits to eat and, occasionally, offer them with other wild fruits for sale in the local marketplace. The most popular species in the Nariño-Putumayo region of Colombia are *S. brachybotrys, S. bullosa,* and *S. tomentosa,* all known as "moquillo." In other parts of South America, the fruits of other species are also known to be edible (also see Pérez-Arbelaez, 1956). In the Guatemalan markets and Central American countries, the fruits are sometimes offered for sale (Standley, 1937; Standley and Steyermark, 1949).

2. **Wood.** The use of the trunk and branches for firewood is a common practice, as various field workers have noted. For example, Cabrera (coll. no. *154*) observed that the wood of *S. ursina* is used for making charcoal. The stems of *Saurauia* have a soft pith which is hollowed out and used in Honduras by the natives as blowguns (Hunter, 1966). In the Sibundoy Valley of Colombia, the straight trunks of *S. brachybotrys* (3-6 m. long), which commonly grow in the area, are used locally in house constructions.

Although many species grow to 20-30 m. tall with a diameter up to 40 cm. at base, and an appreciable volume of wood, *Saurauia*

wood is not of commercial importance (also see Acosta-Solis, 1960). Record and Hess (1943, p. 508) describe the wood of *Saurauia* as follows:

> Wood pale reddish brown throughout; not attractive. Luster rather low. Odorless and tasteless. Rather light, but firm, tough, and strong; sp. gr. (air-dry) 0.58; weight 36 lbs. per cu. ft.; texture medium; grain straight; easy to cut, saws finely wooly, is rather hairy under the plane; probably not durable. Useful locally for general carpentry and interior construction.

3. **Other uses.** Aside from its edible fruits and its wood, little is known as to other uses of *Saurauia* in the Americas. Uses commonly related to folk medicine are generally questionable in efficacy. According to a native of the Sibundoy Valley, the pith of *moquillo (S. brachybotrys)* may be extracted and applied to snake bite to soothe or even cure it. Likewise, Schultes (*Schultes 3203,* also from the Sibundoy Valley) noted that "the bark rasped and the powder applied to sores to extract pus." In Central America, Standley (1923, p. 814) observed that "the fruit (of *pipicho*, a species of *Saurauia*) is said to be sweet and mucilaginous, and syrup made from it is administered for chest affections."

Systematic Position

The systematic position of *Saurauia* has long been the subject of discussion and has not been settled. *Saurauia* is closely related to *Actinidia,* and the current taxonomic practice is to refer *Saurauia* to either Actinidiaceae, Dilleniaceae, or Saurauiaceae.

When Willdenow (1801) established the genus, he placed it within *Polyandria Pentagynia* (Tiliaceae), which De Candolle (1822, 1824) later included in Ternstroemiaceae (Theaceae). *Actinidia,* described in 1836 by Lindley, was originally assigned by him to Dilleniaceae. Several years later, Siebold and Zuccarini (1843) recognized the similarities between *Actinidia* and *Saurauia,* when the fruits of the former were collected (Lindley did not have fruits). They then assigned these two genera, with some doubt, to Ternstroemiaceae. In the same year, Endlicher, who had earlier (1840) treated *Saurauia* in Theaceae and *Actinidia* in Dilleniaceae, in the third Supplement to his *Genera Plantarum* assigned the two genera within the tribe Sauraujeae of Ternstroemiaceae. Bentham (1861) and later Bentham and Hooker (1867) followed Endlicher. Baillon (1873) separated the two genera again, and placed *Saurauia* in Theaceae and *Actinidia* in Dilleniaceae. Gilg (1895), while placing the two genera

in Dilleniaceae, treated *Saurauia* under Saurauieae and *Actinidia* under Actinidieae. Van Tieghem (1899) separated *Saurauia* and *Actinidia* from Dilleniaceae and defined a new family, Actinidiaceae, to include these two genera. Hallier (1912) felt that *Saurauia* and *Actinidia* should be accommodated in Clethraceae (of Ericales), and assigned them there together with *Clematoclethra,* in the tribe Saurauieae. Lechner (1915), who made a study of the comparative anatomy of the ovules of *Actinidia, Clethra, Clematoclethra,* and *Saurauia*, agreed with Hallier. Schnarf (1924), however, on the basis of the comparative embryology of *Saurauia* and *Actinidia,* did not fully agree with Hallier. On the one hand, he recognized the gap between the two genera; on the other, he acknowledged a close relationship between them and to both the Theaceae and Clethraceae. Gilg and Werdermann (1925) accepted Actinidiaceae, but also included in it *Clematoclethra* and *Sladenia.* Hutchinson (1926, 1959) recognized Actinidiaceae as distinct from Dilleniaceae, but, unlike Van Tieghem, he restricted the lianous, predominantly dioecious Actinidaceae to the single genus *Actinidia.* He established Saurauiaceae as a separate family comprised only of the genus *Saurauia.* In his system, he placed Saurauiaceae together with Actinidiaceae in the Theales, and Dilleniaceae in the Dilleniales. Engler and Diels (1936) again united *Saurauia* and *Actinidia* under Actinidiaceae, which, along with Dilleniaceae, they placed in the Theineae of the order Parietales (followed by Lawrence, 1951). Record and Hess (1943), who made extensive studies on the wood anatomy of the New World angiosperms, firmly supported Hutchinson in accommodating *Saurauia* in a separate family, Saurauiaceae, which Record (1926) had previously noted was related to Theaceae. Metcalfe and Chalk (1950), in their *Anatomy of the Dicotyledons,* again stressed the separation of *Saurauia* from *Actinidia* into two distinct families. Erdtman's (1952) conclusion on the basis of his pollen studies supports the opinion which refers *Saurauia* to Clethraceae. Melchior, in the 1964 edition of Engler's *Syllabus,* treated Saurauiaceae as a synonym of Actinidiaceae, which comprises three subfamilies, Actinidioideae *(Actinidia),* Saurauioideae *(Saurauia),* and Clematoclethroideae *(Clematoclethra).* He placed the family along with Dilleniaceae and Theaceae in the Guttiferales. Hunter (1966) believed that *Saurauia* should be assigned to Clethraceae, but he did not do so, referring it, instead, to Dilleniaceae. Cronquist (1968) recognized Actinidiaceae (*sensu* Van

Tieghem) and placed it, together with Theaceae, in the Theales, while Takhtajan (1969) maintained the separation of *Actinidia* from *Saurauia* as two separate families, Actinidiaceae and Saurauiaceae, both of which were placed under Ericales, together with Clethraceae.

The inclusion of *Saurauia* and *Actinidia* in the Dilleniaceae is usually based upon the presence of raphide-bearing cells in these two genera, a phenomenon common to members of this family. This character has been held by various authors not to be of such systematic importance as are the characters of floral structure. Wood anatomy does not support the inclusion of *Saurauia* in the Dilleniaceae, since the wood of *Saurauia* lacks the broad rays characteristic of the family (Record, 1926) and since spiral thickenings in the vessels of *Saurauia* are absent in Dilleniaceae (Dickison, 1967). In addition, the seeds of *Saurauia* are non-arillate, as opposed to the arillate seeds of all members of Dilleniaceae.

The inclusion of *Saurauia* and *Actinidia,* in Theaceae (Ternstroemiaceae) is understood for obvious reasons, among them: pentamerous flowers; quincuncial aestivation of sepals; numerous, distinct, and epipetalous stamens; one, multi-locular pistil; axile placentation; distinct styles (for most of their length but fused at base); non-arillate seeds; and a straight embryo embedded in endosperm. Cytologically, *Saurauia* also seems to be allied to Theaceae (Soejarto, 1970), whereas embryological and anatomical studies show close alliance between *Actinidia* and Theaceae. However, the ovules in Theaceae are chiefly bitegmic and crassinucellate, the fruit a capsule, as opposed to the unitegmic and tenuinucellate ovules, and a berry type of fruit of Actinidaceae (*sensu* Van Tieghem). Nevertheless, the frequent practice of including *Saurauia* and *Actinidia* in the Theaceae, before Van Tieghem established his Actinidiaceae, indicates a close affinity between the two.

On the basis of similarities in pentamerous flowers, quincuncial aestivation of the sepals, anther orientation at anthesis, unilacunar nodal anatomy, axile placentation, tricolporate unornamented pollen, numerous small seeds (with straight embryo) embedded in endosperm, woody habit, mountainous tropical habitat, and epipetalous stamens, *Saurauia* with its close allies *Actinidia* and *Clematoclethra* should, according to Hunter (1966), be referred to Clethraceae. However, as pointed out by Cronquist (1968), the high to extremely high number of stamens, and the often wholly separate

styles establish a distinct gap between *Saurauia* and its allies, and Clethraceae. In addition, Actinidiaceae (*sensu* Melchior, 1964) have axillary inflorescences, whereas Clethraceae have terminal inflorescences (with the exception of *Schizocardia,* which has the inflorescence subterminal). Further distinctions in inflorescence structure and type of fruit may be made between these two families.

The close affinity between *Saurauia* and *Actinidia* is demonstrated by the following commonly shared characters: numerous, distinct, epipetalous stamens; one multi-loculed pistil; unitegmic, tenuinucellate ovules; areolate, nonarillate seeds (fruit a berry). Basically, these are characters used by Van Tieghem (1899) to define his Actinidiaceae. That most members of *Saurauia* are functionally dioecious (Soejarto, 1970 and unpublished data) demonstrates further a close affinity between this genus and the predominantly dioecious *Actinidia.*

On the basis of all considerations, *Saurauia* and *Actinidia,* with their ally *Clematoclethra,* should be placed together in the same family Actinidiaceae. In determining relationship, floral characters should have more weight, and herbarium studies of the groups concerned further confirm this statement.

Regarding relationships among the higher categories, Cronquist (1968, p. 194) said:

> "The Actinidiaceae are clearly out of place in the Dilleniales, because of their syncarpous ovary with unitegmic, tenuinucellate ovules, in contrast to the apocarpus gynoecium and bitegmic, crassinucellate ovules of the Dilleniales. The Theales are also chiefly bitegmic and crassinucellate, but there are some exceptions and transitional forms. Both *Marcgravia* and *Hypericum,* for example, are essentially tenuinucellate, and *Marcgravia* also shows stages in the fusion of the integuments. It is but a short further step to the single integument of the Actinidiaceae. The ovular structure of the Actinidiaceae would be perfectly at home in the Ericales, as would the frequently poricidal dehiscence of the anthers. The large number of stamens and often wholly separate styles would be out of place in the Ericales, however. Altogether the Actinidiaceae seem to be most at home in the Theales, where they may be regarded as fairly closely related to the Theaceae and near-ancestral to the Ericales."

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TAXONOMY

SAURAUIA WILLD., Ges. Naturf. Freunde Berlin Neue Schriften 3: 407. 1801 (*Saurauja*-diagn., *Saurauïa-pl.*).—Type species: *S. excelsa* Willd.

Scapha Noron., Rel. Pl. Javan. *in* Verh. Batav. Genootsch Kunsten 5 (ed. 1), Art. 4: 3. 1790 (nom. nud.).

Palaua R. & P., Prodr. Fl. Peruv. Chilens. 100, *pl. 22.* 1794 (non Cavanilles, 1785).—Type species: *Palaua lanceolata* R. & P.

Apatelia DC., Mém. Soc. Phys. Genève 1: 426. 1822.

Vanalphimia Leschen. ex DC., Mém. Soc. Phys. Genève 1: 419. 1822, pro syn.

Marumia Reinw. ex Bl., Cat. Gewass. Buitenzorg 79. 1823.

Leucothea Moç. & Sessé ex DC., Mém. Soc. Phys. Genève 1: 419. 1822, pro syn.

Davya Moç. & Sessé ex DC., Prodr. 1: 525. 1824, pro syn.

Reinwardtia Bl. ex Nees, Syll. Pl. Nov. Ratisb. 1: 196. 1824 (n. v.) (non Spreng., nec Dum., nec Korth.).

Tonshia Hamilt. ex D. Don, Prodr. Fl. Nepal. 225. 1825, pro syn.

Blumia Spreng., Syst. Veg. 3: 126. 1826.

Overstratia Desch. ex R. Br. *in* Bennet, Pl. Jav. Rar. 171. 1840.

Obelanthera Turcz., Bull. Soc. Imper. Naturalistes Moscou 20 (1): 148. 1847.

Draytonia A. Gray, U.S. Explor. Exped. Bot. 1: 206. *pl. 15.* 1854.

Trematanthera F. v. Muell., Victoria Naturalist 3: 71. 1886.

Pubescent trees and shrubs. Leaves simple, spirally arranged, petiolate, penninerved, exstipulate. Inflorescences basically thyrsiform (sometimes reduced to a single flower in Asiatic species), axillary. Flowers bisexual, actinomorphic, basically pentamerous (tetramerous in *S. yasicae*), bracteolate, buds usually globose (ellipsoidal in *S. adenodonta*); sepals 3-6(-8), usually 5, mostly green and somewhat fused at base, persistent, aestivation quincuncial, outer ones usually somewhat smaller and

more densely pubescent, all usually ciliolate to ciliate marginally and/or apically; petals 3-6(-9), usually white to rarely pink, fused at base, falling as a unit with stamens; stamens indefinite, filament white, adnate to corolla base, filiform, pubescent at base (trichomes filiform, reddish brown to dark deep red in color), anther yellow, bifurcate, versatile, extrorse, basally dehiscent by rimiform pores; ovary superior, usually globose, 3-7- but usually 5-loculed, sulcate, mostly glabrous; styles as many as locules, obsolete to exceeding androecium in height, free, but often slightly coherent at base (sometimes coherent throughout in Asiatic species), filiform to somewhat fleshy, ovules indefinite, anatropous, unitegmic, placentation axile. Fruits baccate, seeds numerous, small, somewhat globose to irregularly ellipsoid, areolate, embedded in a mucilaginous pulp; embryo straight, one-third to one-half as long as seed, endosperm copious, mealy.

KEY TO SERIES

1. Leaves and inflorescences distributed from tip of to low along branchlets/stems; shrubs ..... I. Ser. **Omichlophilae**
1. Leaves and inflorescences clustered behind or crowded around tip of branchlets; shrubs and trees.
   2. Ovary and fruit pubescent ..... II. Ser. **Gynotrichae**
   2. Ovary and fruit glabrous.
      3. Leaves with tertiary veins immersed beneath, scarcely more prominent than lesser venation; plants usually glabrescent ..... III. Ser. **Laevigatae**
      3. Leaves with tertiary veins elevated beneath, more prominent than lesser venation; plants pubescent.
         4. Plants mostly glabrescent to sparingly pubescent, flowers less than 13 cm. broad at anthesis (except *S. schultesiana*), sepals glabrous to partly and sparingly pubescent outside, glabrous inside, stamens less than 40 IV. Ser. **Parviflorae**
         4. Plants sparingly to copiously pubescent, flowers vary in size, sepals pulverulent or pubescent outside, partly to entirely pubescent inside (except *S. tambensis* and *S. chaparensis*), stamens over 40.
            5. Sepals pulverulent, trichomes shorter than 0.5 mm.; branched trichomes mostly predominate all over the plant. V. Ser. **Pulverulentae**
            5. Sepals pubescent, trichomes 0.75 mm. or longer; unbranched trichomes mostly predominate all over the plant.
               6. Leaves sparingly to abundantly pubescent beneath, but not so dense as to be velvety or wooly, lower epidermis not obscured by pubescence under lower power ..... VI. Ser. **Macrophyllae**
               6. Leaves densely lanate beneath, velvety and soft to touch, lower epidermis obscured by pubescence under low power. VII. Ser. **Lanatae**

I. Ser. OMICHLOPHILAE Soejarto, ser. nov.

Brachitrichae Busc., Malpighia 25: 220, p. p. min.
Gynogynae Busc., l. c. 220, p. p. min.
Stenobasicae Busc., l. c. 220, p. p. min.

Frutices per folia et inflorescentiae infertis secus ramulos et caules distributis caractentur.

1. Leaves glabrous to glabrescent, subsessile to very shortly petiolate, petioles 0.2-0.7 cm. long, leaf base truncate. .....1. *S. spinuligera*
1. Leaves sparingly to abundantly pubescent, distinctly petiolate, petioles 1 cm. or longer, leaf base cuneate.
   2. Inflorescence densely pubescent, leaves chartaceous, scabrous and opaque above, stellate trichomes abundant to scattered beneath .....2. *S. stapfiana*
   2. Inflorescence sparingly pubescent, leaves coriaceous to subcoriaceous, glossy and smooth above, radiate trichomes scattered beneath.
      3. Flowers 20-30 mm. broad, leaves broadly elliptic to obovate with length/width ratio of (1.2-)2(-2.3)/1, secondary veins (6-)8-12(-16) pairs 3. S. *omichlophila*
      3. Flowers 12-23 mm. broad, leaves narrowly elliptic to obovate with length/width ratio of (1.2-)3(-3.5)/1, secondary veins (9-)13-18(-22) pairs 4. S. *caquetensis*

1. **Saurauia spinuligera** R. E. Schultes, Caldasia 2: 44. 1943. — Type: *Pennell 10452* (GH, holotype). Figure 3.

Shrubs, glabrescent to sparingly pubescent. Branchlets very slender, terete, glabrous to sparingly aculeate-hirsute (spinuligerous); trichomes (spinules, cf. Schultes) if present yellowish to golden brown, base (mammae, dto.) grayish yellow, elliptic-subconoidal, becoming abruptly very slender, straight to flexuous toward apex, to 5 mm. long. Leaves distributed from tip of to low along branchlets; blades oblong-elliptic, shortly and abruptly acuminate at apex with acumen to 5 mm. long, truncate to cordate at base, serrulate along margins, 6-12.5 cm. long, 2-4.5 cm. wide, coriaceous in dry state, gray to dark gray-brown above, gray to gray-brown beneath, subglossy and smooth above, secondary veins immersed, scarcely more prominent than lesser venation, glabrous on both sides but with setulose to setose trichomes along midrib and secondary veins beneath; petioles 0.2-0.7 cm. long, 1-2.5 mm. in diameter, somewhat canaliculate, glabrous to scattered setose pubescent. Inflorescences distributed from tip of to low along branchlets, ascending to pendulous, 5-13-flowered, 7.5-15 cm. long, 2-4 cm. wide, glabrous, primary penduncle very slender, to 1.5 mm. in diameter, bracts linear, to 5 mm. long. Flowers 12.5-15 mm. broad, buds to 4 mm. in diameter, pedicels 1.5-5 mm. long, bracteoles subulate, 1-3 mm. long; sepals 5, outer 2 ovate to elliptic, acute to obtuse, 4-5 mm. long, 2.5-3 mm. wide, imbricate one and inner 2 suborbicular to broadly elliptic, obtuse, 5-6 mm. long, 4.5-5 mm. wide, all glabrous throughout, marginally entire to irregularly ciliolate; petals 5, white, suborbicular to obovate, obtuse to rounded, 8-9 mm. long, 7-8 mm. wide; stamens 20-25, filament 1.5-2 mm. long, anther 1.5 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, to 4.5 mm. long, subcapitate. Berries 5-loculed, globose, to 6 mm. (8-10 mm., cf. Schultes) across, 5-sulcate.

Habitat.—Mossy forest on spur (subparamo), at altitudes of 2,800-3,300 m.

Distribution.—Colombia (Departments of Antioquia and Caldas).

Specimens examined.—COLOMBIA, ANTIOQUIA: vic. Medellin, Tamesis, Feb., fl. fr., *Toro 983* (MEDEL, NY). CALDAS: Cord. Occid., Cerro Tatama, fr., *Pennell 10452* (GH).

When this species was described, only fruiting material *(Pennell 10452)* with exceedingly young flower buds was available. *Pennell 10452* has what Schultes called "spinules," hence the specific name, along the branchlets. These spinules become slender and the swollen base decreasing in thickness higher up the branchlets. In contrast, the flowering material represented by *Toro 983* is devoid of any epidermal emergencies along the glabrous branchlets and petioles. It seems that the spinules may not be typical of this species. More characteristic are the oblong-elliptic leaves with truncate to cordate base, and the short or almost lacking petioles. In this respect, the species is unique among South American *Saurauia*. The glabrous sepals and the mode of leaf distribution from the tip of to low along the branchlets, together with the high altitudes at which the species grows, indicate close relationship to *S. omichlophila,* the reason for its inclusion in the Ser. **Omichlophilae.**

2. **Saurauia stapfiana** Busc., Malpighia 27: 314. 1916. —Type: *Triana 267* (P, lectotype; G. K, isolectotypes; F, GH, photos). Figure 4.

Shrubs to 3(-5) m. tall, erect to rarely bushy, copiously pubescent. Branchlets slender, obtuse-angled to terete, densely to sparingly strigose, trichomes rusty brown, to 4 mm. long. Leaves distributed from tip of to low along branchlets; blades elliptic to obovate, acuminate at apex with acumen to 15 mm. long, cuneate to obtuse but rarely oblique at base, serrate to serrulate along margins, (8-)10-20(-23) cm. long, (3-)5-8(-10) cm. wide, subcoriaceous, dark green above, green with yellow to rose-colored veins beneath (in dry state dark brown to sooty above, rusty brown beneath), often rugulose and scabrous above, secondary veins (15-)17-23(-27) pairs, tertiary veins elevated, more prominent than lesser venation, sparingly strigillose pubescent (trichomes often reduced to warts) along secondary and minor veins and densely strigose to strigillose pubescent along midrib above, abundantly to sparingly pubescent, with trichomes of stellate to radiate types along and between veins and mixed with setose types along major veins beneath; petioles (0.5-)1.5-2(-3) cm. long, 1.5-2 mm. in diameter, half-terete to furrowed above, densely to abundantly pubescent with trichomes of stellate and strigose types. Inflorescences distributed from tip of to low along branchlets, ascending to curving downward but rarely pendulous, (3-)5-15(-20)-flowered (lateral cymes often reduced to one flower), (1-)3-13(-20) cm. long, (0.7-) 2-4(-6) cm. wide, densely strigose to shaggy-strigose pubescent, primary peduncle slender, to 10 mm. long. Flowers 12.5-17.5 mm. broad, buds to 5 mm. across, pedicels 4 mm. long, bracteoles linear to triangular, to 4 mm. long; sepals 5, green to greenish white, ovate to orbicular-ovate, acute to obtuse but very rarely truncate, 4.5-6 mm. long, 3.5-4.5 mm. wide, exposed parts in bud abundantly strigose to shaggy-strigose pubescent, imbricated parts glabrous, marginally ciliate to ciliolate,

all glabrous inside; petals 5, white, oblong-elliptic to obovate, rounded and often incised, 5-8 mm. long, 4-6 mm. wide, stamens 20-40, filament 2-2.5 mm. long, anther 2-3 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, obsolete to 5 mm. long, stigmas simple to capitate. Berries green, subglobose, to 6 mm. across, 5-sulcate.

Habitat.—Rich soil in wet mountain forest, humid and open forest, subparamo (with low shrubs, ferns, and sphagnum), cloud-zone vegetation (of low trees, shrubs, and ferns), shady and semi-shady places, second-growth areas and open hillsides, at altitudes of 1,700-3,200 m.

Distribution.—Colombia (Departments of Chocó, Antioquia, Boyaca, Tolima, Valle and Cauca).

Vernacular names.—*Lulumoco* (Chocó: Barkley & Molina).

Saurauia stapfiana is characterized by the combination of the following features: leaves relatively small and predominantly obovate with stellate to radiate pubescence on the lower surface, distributed from the tip of to low along the branchlets, inflorescences small, few-flowered, little- to non-branched, flowers with sepals glabrous inside and on the imbricated parts, and with a low to moderate number of stamens. Two varieties can be distinguished: var. *stapfiana* and var. *radiata*.

1. Lower leaf pubescence stellate, trichomes 0.3-1.3 mm. broad ... a. var. *stapfiana*
1. Lower leaf pubescence radiate, trichomes 0.2 mm. broad ..... b. var. *radiata*

a. **Saurauia stapfiana** var. **stapfiana.**

Specimens examined.—COLOMBIA, CHOCO: La Mansa, Jan., fl., *Molina & Barkley 19-Ch-030* (F, K, US). ANTIOQUIA: Medellin, Dec., fl., *Sandeman 5522* (COL, K); N. of Medellin, near San Pedro, Sept., fl., *Lehmann 4031* (K, US); NW of Medellin, Camino Real Antiguo (Boquerón de San Cristobal), June, fr., *Barkley & Correa 123* (US); 1 km. S. of Hoyo Rico, Sept., fl. fr., *Correa & Barkley L-80A-202* (US); road between Medellin and El Retiro at vic. of Las Palmas, Oct., fl., *Diaz 38* (F, MEDEL), Dec., fl., *Falla 15* (F, MEDEL), May, fl. fr., *Gutierrez et al. 119* (MEDEL, US), *120* (US), Aug., fl., *Hatheway 1546* (B), Sept., fl., *J. Uribe 257* (MEDEL); El Retiro, fl., *Daniel 3244* (MEDEL); La Ceja, Alto de Pantanillo, Dec., fl., *Uribe-Uribe 4191* (COL, ECON); road Medellin-Dabeiba, April, fl., *Romero-Castañeda 2443* (F, MEDEL). TOLIMA: Mariquita, fl., *Triana 267* (G, K, P; GH, photo; with the original note: Prov. de Mariquita et Antioquia, forets du Quindio et de Antioquia).

b. **Saurauia stapfiana** var. **radiata** Soejarto, var. nov.

Folia subtus distante ad sparse radiata, trichomatibus radiatis minus quam 0.2 mm. in diametro, brachiis elongate conoideis minus quam 0.1 mm. longis.—Typus: *Soejarto & Rivera 2045* (GH, holotypus; ECON, MEDEL, isotypus).

Specimens examined.—COLOMBIA, ANTIOQUIA: road between Prado and Armenia, vic. of Las Partidas, Jan. fl., *Uribe-Uribe 2888*, fl. fr., *2889* (both in COL, ECON, GH); Sonson, below Paramo de Sonson, June, fl., *Soejarto & Rivera 2045, 2046* (both in ECON, GH, MEDEL). BOYACA: Sierra Nevada del Cocuy, along path from Laguna Seca to Bachira, Aug., fl., *Grubb et al. 607* (US). VALLE: Cordillera Central, ridge, between Las Brisas and La Marina, *Cuatrecases 22647* (ECON, F). CAUCA: Cordillera Central, western drainage of paramo de Puracé, above Quebrada de Rio San Juan, Oct., fl., *Cuatrecasas & Willard 26315* (US).

3. **Saurauia omichlophila** R. E. Schultes, Caldasia 2: 319. 1944.—Type: *Schultes 3236* (ECON, holotype; COL, GH, isotypes).

Shrubs to 5 m. tall, erect to declining or straggling, rarely spreading, little to profusely branched; sparingly pubescent. Branchlets terete to obtusely angled, glabrescent to abundantly pubescent, trichomes of hirsute to hirsute-strigose types, yellowish white to gray-brown or rose-colored. Leaves distributed from tip of to low along branchlets; blades obovate to elliptic, abruptly and shortly acuminate at apex, cuneate to broadly cuneate-rotundate at base, serrulate to setaceous-serrulate along margins, (2-)4-10(-15) cm. long, (1-)2-4(-6) cm. wide, coriaceous, sublaevigate to glossy above, dark green on both sides, secondary veins (6-)9-12(-14) pairs, tertiary veins immersed, scarcely more prominent than lesser venation, scattered pubescent with setose to hirsute trichomes along veins above, later glabrescent, scattered to sparingly sericeous-hirsute pubescent along and between veins, sometimes with scattered radiate trichomes beneath; petioles 0.5-2 cm. long, 0.75-1.5 mm. in diameter, sparingly to abundantly pubescent, trichomes of setose to sericeous hirsute types. Inflorescences distributed from tip of to low along branchlets and stems, often horizontal to pendulous, (3-)7-20(-35)-flowered, (5-)8-13(-18) cm. long, 2-5 cm. wide, abundantly setose to sericeous-hirsute pubescent, primary peduncle 4-8 cm. long, bracts linear, to 5 mm. long, rarely foliaceous, to 25 mm. long. Flowers 20-30 mm. broad, buds to 10 mm. in diameter, pedicels to 5(-6) mm. long, bracetoles linear to subulate, 3-5 mm. long; sepals 5-8, ovate to suborbicular, obtuse, 6-8 mm. long, 4-7 mm. wide, exposed parts in bud sparingly to abundantly pubescent, trichomes of hirsute-strigose type, imbricated parts glabrous, all glabrous inside, marginally and apically ciliolate; petals 5-9, white to rose-colored, oblong to elliptic-oblong, obtuse to incised, (8-)10-15 mm. long, 5-10 mm. wide; stamens (10-) 20-30(-40), filaments 3-4 mm. long, anther 2.5-3 mm. long; ovary 5-8-loculed, globose, 5-8-sulcate, glabrous, styles 5-8, obsolete to 4(-5.5) mm. long, stigmas simple to subcapitate. Berries green to purple, (4-)5-8-loculed, globose, to 10 mm. across, 5-8-sulcate.

Habitat.—Wet mountain forest, cloud forest, mist-zone, and subparamos, usually only in undisturbed, shady, and wet places on rich humus, at altitudes of 2,500-3,200 m.

Distribution.—Colombia (Departments of Cauca, Nariño, Putumayo).

Vernacular names.—*Moquillo de páramo* (Sibundoy Valley: Schultes), *Dji-nu-sse* (Sibundoy Valley, Kamsa Indian name: Schultes), *Moquillo de páramo* (Pasto: Soejarto).

Specimens examined.—COLOMBIA, CAUCA: between Valencia and San Sebastian, west side of the mountain, *Core 1018, 1019* (both in NY, US); Cordillera Central, east facing slope, *Cuatrecasas 23662* (F, US); El Derrumbo Mountain, *Killip 7986* (NY); Puracé, vic. of Lake San Rafael, *Uribe-Uribe 3876* (COL, ECON). NARIÑO: road to Mocoa, between El Encanto and Dolores, *Garcia-Barriga et al. 13023* (COL, MEDEL, US); above Lake La Cocha, Paramo de Tabano, *Hernandez 79* (ECON, GH, PASTO); Ciudadela, La Cocha to Sibundoy, near Páramo de Bordoncillo, *Schultes & Villarreal 7560* (COL, ECON, F, GH, K, NY, US), *7560A* (COL, ECON, GH, US); between Lake La Cocha and Paramo de Tabano, *Schultes & Villarreal 7771* (COL, F, GH, K, US); Pasto, above "Bosque Botana" Exptl. Garden, *Soejarto & Porter 478* (ECON, GH), *Soejarto 1500, 1501, 1509, 1511, 1517, 1598* (all in ECON, GH), *977* (COL, ECON, GH, PASTO), *1493* (ECON, F, GH, L, NY, P, PASTO, UC, US), *1497* (ECON, GH, PASTO), *1502* (ECON), *1521* (ECON, F, G, GH, US). PUTUMAYO: between San Antonio de Bordoncillo and Santiago de Sibundoy, *Cuatrecasas 11790* (COL, US); Paramo de San Antonio, between Lake La Cocha and Sibundoy, *Schultes 3236* (ECON, holotype; COL, GH, isotypes); between La Maria and Paramo de San Antonio, *Schultes & Villarreal 7550* (COL, F, GH, K, US); Sibundoy Valley, *Garcia-Barriga 4563* (COL, US; F, GH, NY, photos), *Schultes & Cabrera 20098* (GH); Paramo de Las Ovejas, between El Encanto and Sibundoy Valley, *Soejarto 1051* (ECON, GH, PASTO); km. 40 east of Pasto, road to Sibundoy Valley, *Soejarto 1176* (COL, F, G, GH, NY, PASTO, US), *1177* (ECON, GH, PASTO), *1178* (ECON, GH).

Saurauia omichlophila is abundantly represented in the mountain system of Nariño and Putumayo, where the plants commonly grow in the subalpine and cloud-covered zone on rich black soil. The slender stem and branches are often declining and descending to the ground and the plants become bushy, or they can grow very long and slender and straggling among the dense shrub vegetation, such as in the mountain ridges above Pasto. The plants grow either individually or in clumps, which are often produced vegetatively, since the

stems and branches which touch the ground produce adventive roots in the wet and frequently misty habitat.

The indument of the shoot, young leaves, and inflorescences is often ochre-rosy to reddish or greenish brown in color, but turning paler to yellowish white when old. Most members of the species have hirsute to sericeous-hirsute trichomes, but Core's collection from Cauca has strigose to tuberculate-strigose indument (which is deep to reddish brown in color) over the branchlets, leaves, and sepals. The sepals are mostly green, but they may be purplish red or rose-colored.

The irregular repetition of the floral parts in this species is worthy of note. Pentamery and hexamery are quite common, but hepta- and octamery are less frequent. Basically, however, the floral parts are pentamerous, and higher series are always found together with pentamery, in the same plant.

4. **Saurauia caquetensis** R. E. Schultes, Caldasia 2: 32. 1943.—Type: *Cuatrecasas 8439* (US, holotype; COL, F, isotypes). Illustration: Caldasia 2: 33. 1943. Figure 5.

Shrubs to 4 m. tall, erect to bending, much branched but rarely bushy; sparingly pubescent. Branchlets slender, terete, sparingly pubescent, trichomes of shaggy-strigose type, gray to rusty brown in color. Leaves distributed from tip of to low along branchlets; blades narrowly elliptic to elongate-obovate, acuminate at apex with acumen to 15(-25) mm. long, cuneate to obtuse at base, rarely oblique, very rarely with basal flap, serrate to denticulate-serrate along margins, (5-)6-12(-17) cm. long, (1.5-)2-5 cm. wide, chartaceous to subcoriaceous, dark green above, light green beneath, glossy and smooth above, secondary veins (9-)13-18(-22) pairs, tertiary veins immersed to slightly elevated, scarcely more prominent than lesser venation, glabrous to glabrescent with scattered strigose trichomes along major veins above, glabrescent, but major and minor veins with sparingly distributed shaggy-strigose and scattered radiate trichomes beneath; petioles 7-20 mm. long, 1-1.5 mm. in diameter, sparingly strigose. Inflorescences distributed from tip of to low along branchlets, erect to pendulous, 5-20(-30)-flowered, 5-16 cm. long, 1.5-4 cm. wide, pulverulent to abundantly pubescent, trichomes of strigose and stellate to radiate types, primary peduncle (1.5-)3-8 cm. long, bracts linear to subulate, to 10 mm. long. Flowers 12-22.5 mm. broad, buds 5-10 mm. in diameter, pedicels to 5 mm. long, bracteoles triangular, to 5 mm. long; sepals 5, green, ovate to suborbicular, obtuse, 5-7 mm. long, 4-6 mm. wide, all glabrous throughout, marginally and apically entire to ciliolate, especially at apex; petals 5, white, obovate to broadly oblong, rarely spatulate, obtuse to slightly incised, 6-10 mm. long, 4-7 mm. wide; stamens 20-35, filament 3-4 mm. long, anther 2-2.5 mm. long; ovary 5-loculed, subglobose, 5-sulcate, glabrous, styles 5, obsolete to 4(-5) mm. long, stigmas simple to subcapitate. Berries green, subglobose, to 5 mm. across, 5-sulcate.

Habitat.—Cloud-covered and wet mountain forest on rich soil, at altitudes of 2,000-2,800 m.

Distribution.—Colombia (Departments of Huila, Cauca, Putumayo, Caqueta).

Individuals of *Saurauia caquetensis* resemble those of *S. omichlophila* in habit, but they may be distinguished by much narrower leaves (about 3:1 ratio of leaf length/width) in the former. The population in the Putumayo region is characterized by the usually erect to ascending, many-flowered, and many-branched inflorescences with small flowers, in contrast to the pendulous, few flowered, and non-branched inflorescences with large flowers, represented by *Cuatrecasas 8439* collected from Caqueta. Two varieties can be distinguished: var. *caquetensis* and var. *parviflora.*

1. Inflorescences pendulous, unbranched, 5-10-flowered, flowers ca. 20 mm. broad ..... var. *caquetensis*
1. Inflorescences erect to ascending, many-branched, 13-30-flowered, flowers ca. 13 mm. broad ..... var. *parviflora*

a. **Saurauia caquetensis** var. **caquetensis.**

Specimens examined.—COLOMBIA, CAQUETA: Cordillera Oriental, along ridge at Gabinete, March, fl., *Cuatrecasas 8439* (US, holotype: COL, F, isotypes).

b. **Saurauia caquetensis** var. **parviflora** Soejarto, var. nov.

Var. caquetensis differt inflorescentiis erectioribus ad ascendentibus, floribus 13-20(-30) in inflorescentiis, ca. 12.5 mm. in diametro, staminibus 30-35.—Typus: *Cuatrecasas 8532* (US, holotype; GH, NY, photos).

Specimens examined.—COLOMBIA, CAUCA-HUILA: Moscopan, Sept., fl., *Uribe-Uribe 3861* (COL, ECON). PUTUMAYO: km. 40 east of Pasto, Sta. Clara, July, fl., *Soejarto 1052, 1175* (both in COL, ECON, GH, PASTO), *1050, 1513, 1514, 1515, 1516, 1519, 1520, 1524* (all in ECON, GH); Cerro Portachuelo, road San Francisco of Sibundoy to Mocoa, various sites, May, fl., *Schultes & Villarreal 7766* (ECON), July, veg., *Soejarto 1130* (COL, GH, PASTO), *1151* (GH, PASTO), fl., *1148, 1168* (ECON, GH, PASTO), Aug., fl., *1540, 1541, 1549, 1550* (all in ECON, GH), fr., *1560* (ECON, GH).

II. Ser. GYNOTRICHAE Busc., Malpighia 25: 220. 1912.
Brachitrichae Busc., l. c., p. p.

5. **Saurauia loesneriana** Busc., Malpighia 25: 399, *pl. 12, fig. 28.* 1913.—Type: *Jelski 259* (GH, NY, photos).

Shrubs to 3.5 m. tall, erect; copiously pubescent. Branchlets sulcate to terete, abundantly pubescent, trichomes of setose-hirsute to sericeous types, light brown, swollen at base and abruptly turning very slender and flexuous towards apex, to 5 mm. long. Leaves crowded behind tip of branchlets, blades elongate-elliptic to obo-

vate, acute to shortly acuminate at apex with acumen to 10 mm. long, cuneate at base, serrulate along margins, 15-25 cm. long, 4.5-7 cm. wide, chartaceous, dark brown to black above in dry state, dark olive-brown beneath, subglossy and smooth above, secondary veins 23-30 pairs, tertiary veins somewhat elevated, scarcely more prominent than lesser venation, sparingly pubescent above with trichomes of setose to sericeous or strigillose types along veins, abundantly to sparingly pubescent beneath with trichomes of hirsute to sericeous types along major veins, but of radiate to clustered types along and between minor veins; petioles 1.5-3 cm. long, 1.5-2.5 mm. in diameter, sparingly pubescent, with setose-hirsute trichomes. Inflorescences straight, 6-15-flowered, 5-10.5 cm. long, 2-3 cm. wide, densely strigose to sericeous pubescent, primary peduncle stout, 2-4.5 cm. long, bracts linear, to 10 mm. long. Flowers subsessile, 20 mm. broad, buds to 8 mm. in diameter, bracteoles triangular, to 5 mm. long; sepals 5, pale green with rusty brown trichomes, outer 2 ovate to elliptic, 7-8 mm. long, 4-5 mm. wide, subacute, imbricate one broadly ovate to suborbicular, 7-8 mm. long, 6-6.5 mm. wide, obtuse, inner 2 broadly ovate to suborbicular, 7-8.5 mm. long, 6-7 mm. wide, rounded, exposed parts in bud densely pubescent with trichomes of sericeous type, imbricated parts pulverulent with trichomes of stellate type, marginally and apically ciliolate, all densely pulverulent with appressed-stellate trichomes inside; petals 5, white, oblong to obovate, gnawed to entire along margins, praemorse to rarely incised at apex, 10-12 mm. long, 5-7 mm. wide; stamens 30-50, filament 2.75-3.25 mm. long, anther 2.25-3 mm. long; ovary 5-loculed, globose, 5-sulcate, sparingly to abundantly pubescent with trichomes of appressed-stellate type, styles 5, to 5 mm. long, stigmas capitate. Berries known only in immature state, mostly sparingly pubescent on upper portion, glabrescent on lower half.

Habitat.—Shrubby land, clay soil, and sunlit area at altitudes of 2,800-3,000 m.

Distribution.—Peru (Departments of Piura and Cajamarca).

Specimens examined.—PERU, PIURA: Huancabamba, Pacaipampa, Tambillo, fl., *Jelski 259* (GH, NY, photos of type). CAJAMARCA: Cutervo, Arenales, 1 hr. S. of St. Thomas, Dec., fl., *Stork & Horton 10161* (F, G, K, UC). SAN MARTIN: Huallaga, valley of Rio Apisoncho, 30 km. above Jucusbamba, July, fl., *Hamilton & Holligan 1020* (K).

The above description has been based primarily upon *Stork & Horton 10161,* which compares extremely well with the type photograph *(Jelski 259).* Both Buscalioni and Macbride (1956) described the ovary as glabrous, but careful examination of the floral parts of *Stork & Horton* collection revealed that the ovary is pubescent throughout or only on the upper portion. This is an important character, because it is the only South American species with pubescent ovary.

III. Ser. LAEVIGATAE Busc., Malpighia 25: 224. 1912; Hunter, Ann. Missouri Bot. Gard. 53: 80. 1966.

Oligotrichae Busc., Malpighia 25: 224, p. p.
Scabrae Busc., l. c., p. p. min.

1. Sepals glabrous to sparingly pubescent outside, glabrous to partly pubescent (usually on upper half) inside.
   2. Leaves lanceolate to oblanceolate, length to width ratio of 3 or more to 1.
      3. Blade of leaves small, 3-12 cm. long, 1-3.5 cm. wide, villous-barbate at axils of secondary and often tertiary veins beneath; Peru ..... 6. *S. briqueti*
      3. Blade of leaves large, 10-30 cm. long, 3-10 cm. wide, not villous-barbate beneath; Colombia ..... 7. *S. portachuelensis*
   2. Leaves elliptic to obovate, length to width ratio of 2 or less to 1.
      4. Inflorescences and floral parts glabrous throughout; Bolivia .. 8. *S. rusbyi*
      4. Inflorescences abundantly to sparingly pubescent; Colombia to Peru.
         5. Villous-barbate at axils of secondary veins beneath, stamens 50-80, anther less than 0.85 mm. long; Peru ..... 9. *S. glabra*
         5. Villous-barbate pubescence absent beneath, stamens less than 50, anther 1 mm. or longer.
            6. Leaves glabrous except for scattered trichomes along major veins beneath, inflorescences 40- to more than 150-flowered, flowers less than 10 mm. broad, sepals partly pubescent inside, anther 1-1.5 mm. long, ovary mostly 4-loculed; Colombia (to Mexico) ..... 10. *S. yasicae*
            6. Leaves radiate pubescent beneath, with strigose trichomes along midrib, inflorescences 4-30-flowered, flowers 10-15 mm. broad, sepals glabrous inside, anther 2.75-3.25 mm. long, ovary 5-loculed; Ecuador 11. *S. aequatoriensis*

1. Sepals abundantly pubescent throughout or inside only.
   7. Inflorescences 100-200 flowered, flowers less than 10 mm. broad, buds ellipsoidal, ca. 3.5 mm. long; Ecuador ..... 12. *S. adenodonta*
   7. Inflorescences less-than-100-flowered, flowers ca. 15 mm. broad, buds globose, to 6 mm. in diameter; Colombia.
      8. Leaves glabrescent, inflorescences 3-20-flowered, sepals heterotrichous outside, trichomes of strigillose and stellate types ..... 13. *S. strigillosa*
      8. Leaves glabrous, inflorescences 30-100-flowered, sepals homotrichous outside, trichomes of stellate type ..... 14. *S. laevigata*

6. **Saurauia briqueti** Busc., Malpighia 30: 140, *pl. 12, fig. 26.* 1927.—Type: *Weberbauer 2177* (F, leaf fragment, isotype; G, GH, NY, US, photos of holotype?).

Shrubs to 4 m. tall; glabrescent. Branchlets slender, terete, reddish maroon, smooth, glabrous to glabrescent, younger parts sparingly pubescent, trichomes of strigillose to tuberculate-strigillose types. Leaves clustered behind tip of branchlets; blades lanceolate to narrowly elongate-obovate, acute to very shortly acuminate at apex, cuneate at base, serrulate along margins, 3-12 cm. long, 1-3.5 cm. wide, subcoriaceous, glossy and smooth above, secondary veins 12-16 pairs, tertiary veins immersed, scarcely more prominent than lesser venation, mostly glabrous throughout, except for scattered strigillose trichomes along major veins, often villous-barbate

at axils of secondary veins beneath; petioles 0.75-2 cm. long, 1-1.5 mm. in diameter, glabrescent. Inflorescences straight, moderately branched, 25-100-flowered, 4-11.5 cm. long, 2.5-8 cm. wide, glabrescent to sparingly strigillose pubescent, often with minute stellate trichomes along lesser ramification, primary peduncle 2-5 cm. long, bracts linear, to 3 mm. long. Flowers 8-10 mm. broad (buds not available), pedicels 1-2 mm. long, bracteoles triangular, to 1.5 mm. long; sepals 5, oblong to spatulate, subacute to rounded, 3.5-5 mm. long, 2-3 mm. wide, all glabrous throughout, marginally and apically ciliolate; petals 5, orbicular-oblong, rounded, 4-5 mm. long, 2.5-3 mm. wide; stamens 20-30, filament 1.5 mm. long, anther 1 mm. long; ovary 3-5-loculed, ovoid to globose, 3-5-sulcate, glabrous, styles 3-5, 2.25 mm. long, stigmas subcapitate. Berries immature.

Habitat.—Altitudes of 1,800-2,400 m.

Distribution.—Peru (Department of Junin).

Specimens examined.—PERU, JUNIN: Tarma, Huacapistana, Cerro Sincapata, Oct., fl., *Velarde-Nuñez 749* (US, topotype), fl., *Weberbauer 2177* (F, leaf fragment, isotype; G, GH, NY, US, photos of holotype?).

The above description has been based primarily upon *Velarde-Nuñez 749*, a topotype. The outstanding features which separate *S. briqueti* from other Peruvian species are its small, narrowly elongate-obovate leaves, with a length to width ratio of 3-5:1, and a high degree of glabrescence.

7. **Saurauia portachuelensis** R. E. Schultes, Caldasia 2:40. 1943.—Type: *Miguel de Ipiales 40* (ECON, holotype; F, isotype). Illustration: Caldasia 2:41. 1943.

Small trees to 5 m. tall, trunk crooked to straight, crown open; glabrescent to sparingly pubescent. Branchlets stout, terete, glabrescent to sparingly hirsute pubescent, trichomes light to dark silky brown. Leaves clustered behind tip of branchlets; blades oblanceolate to elongate-elliptic, cuspidate to acuminate at apex with acumen to 15 mm. long, cuneate to obtuse at base, serrate to serrulate along margins, 10-20(-30) cm. long, 3-6(-10) cm. wide, strongly coriaceous, dark green above, light to dull green beneath, glossy and smooth above, secondary veins (10-)15-25(-30) pairs, usually depressed above, tertiary veins immersed, scarcely more prominent than lesser venation, glabrous throughout except for setose to appressed-setose trichomes along midrib above and along midrib and secondary veins beneath; petioles 0.75-2 cm. long, 2-3 mm. in diameter, sparingly setose pubescent. Inflorescences erect, straight, 50-100(-150)-flowered, (10-)14-20(-25) cm. long, 3-6 cm. wide, glabrous on lower parts, pulverulent with appressed strigose mixed with minute stellate trichomes on upper parts, primary peduncle 5-10 cm. long, bracts linear-subulate, to 9 mm. long, glabrous to sparingly strigose pubescent. Flowers 7.5-12.5 mm. broad, buds to 4 mm. in diameter, bracteoles triangular, to 3 mm. long; sepals 5, green, outer 2 and imbricate one ovate to elliptic, obtuse to subacute, 3-3.5 mm. long, 1.5-2 mm. wide, inner 2 obovate to orbicular-obovate, 3-4 mm. long, 2-3 mm. wide, all glabrous throughout, marginally ciliolate (fimbrilliferous, see Schultes); petals 5, elliptic to

orbicular-obovate, rounded, sometimes incised, 5-7 mm. long, 3-5 mm. wide; stamens 15-30, filament 2-2.5 mm. long, anther 2-3 mm. long; ovary 5-loculed, subglobose to ellipsoid, 5-sulculate, glabrous, styles 5, obsolete to 3.5 mm. long, stigmas simple to subcapitate. Berries dark green, 5-loculed, globose, to 7 mm. across, 5-sulcate.

Habitat.—Wet mountain forest, subparamo, and cloud-covered zone at altitudes of 2,000-3,000 m.

Distribution.—Colombia (Department of Putumayo).

Vernacular names.—*Moquillo de páramo* (Sibundoy: Miguel de Ipiales).

Specimens examined.—COLOMBIA, PUTUMAYO: Upper reaches of Putumayo River in the Sibundoy Valley, along mountain ridge, La Cabaña, Jan., fl., *Cuatrecasas* 11643 (COL, F, US); horse trail from San Francisco of Sibundoy to Mocoa, Jan., fl., *Miguel de Ipiales 40* (ECON, F); road Sibundoy to El Pepino of Mocoa, Cerro Portachuelo, Aug., fl., *Soejarto 521,* fr., *522,* July, fl., *1149,* fr., *1150,* fl., *1158,* fr., *1167,* Aug., fr., *1539,* veg., *1542,* fl., *1574,* (all in ECON, GH); above Sibundoy Valley, road to Pasto, La Chorrera, Aug., fr., *Soejarto 1528* (ECON, COL).

Individuals of *S. portachuelensis* are easy to recognize in the field from their strongly coriaceous, glabrous, and elongate leaves which are shiny above, and the glabrescent, many-flowered inflorescences with small white flowers, the glabrous sepals, and the low number of stamens. The species is abundantly represented in the wet mountain forests along Cerro Portachuelo, in particular between the Sibundoy Valley and Mocoa. They may be found on black rich soil, rocky soil, stream bank, rocky cliff with thick soil, or along gullies, but not in open or exposed places.

8. **Saurauia rusbyi** Britt., Bull. Torrey Bot. Club 16:64. 1889.—Type: *Rusby 482* (MICH, lectotype; NY, isolectotype). Figure 6.

Shrubs?; sparingly pubescent. Branchlets slender, terete, glabrescent to sparingly hirsute pubescent. Leaves clustered behind tip of branchlets; blades obovate, shortly acuminate at apex with acumen to 10 mm. long, cuneate at base, serrate (aristate-serrate, see Britton) along margins, 10-20 cm. long, (3-)5-8 cm. wide, chartaceous, in dry state sooty above, olive-brown beneath, smooth and glossy above, secondary veins 10-14 pairs, tertiary veins immersed, scarcely more prominent than lesser venation, sparingly strigillose between and along veins and abundantly sericeous pubescent along midrib above, sparingly hirsute pubescent along major veins beneath; petioles 1-2 cm. long, 1-2 mm. in diameter, glabrescent to sparingly hirsute pubescent. Inflorescences slender, 15-30-flowered, 8-15 cm. long, 4-7 cm. wide, mostly glabrous except for ciliate to fimbriate bracts and bracteoles, primary peduncle very slender (1-1.5 mm. in diameter), 4.5-8 cm. long, bracts subulate to triangular, to 4 mm. long.

Flowers 10-15 mm. broad, buds to 3.5 mm. in diameter, pedicels extremely slender, 7.5-15 mm. long, bracteoles subulate, to 1.5 mm. long; sepals 5, broadly elliptic to suborbicular, rounded, 3-4 mm. long, 3-3.5 mm. wide, all glabrous throughout, marginally ciliolate; petals oblong-obovate, rounded to incised, 5-8 mm. long, 4-6.5 mm. wide; stamens 30-40, filament 2.5 mm. long, anther 1-1.25 mm. long; ovary 5-loculed, subglobose, 5-sulcate, styles obsolete to 3.5 mm. long, stigmas simple to subcapitate. Berries unknown.

Habitat.—Altitudes of 1,500-1,800 m.

Distribution.—Bolivia (Province of La Paz).

Specimens examined.—BOLIVIA, LA PAZ: Mapiri?, fl., *Rusby 481B* (GH, US); near Yungas, fl., *Rusby 482* (MICH, lectotype; NY, isolectotype).

It appears that, because of mislabeling, different collections from different plants have been given the same number: *Rusby 481*. After careful examination, it was possible to separate the material into three groups of specimens, which represent three separate collections: *Rusby 481, 481A, 481B*. The specimens referred to *Rusby 481* (F, G, NY, US; collected at Mapiri, 1,500 m., April, fl.) and *Rusby 481A* (MICH, NY, US; collected at Yungas, 1,800 m., fl) belong to *Saurauia spectabilis,* whereas those referred to *Rusby 481B* (GH, US; collected at Mapiri?, 1,500 m., fl.) belong to *S. rusbyi.* The US collection of *Rusby 481B* was originally labeled *Rusby 482,* but floral characters reveal that this specimen belongs to a functionally staminate plant with obsolete styles. In contrast, the true *Rusby 482* belongs to a functionally pistillate plant with long styles.

S. rusbyi differs from *S. spectabilis* in its glabrous, few-flowered inflorescences with laxly distributed, long- and filamentous-pedicelled flowers, glabrous pedicels and sepals. In addition, *S. rusbyi* has a lower stamen number (30-40) than *S. spectabilis* (45-85).

9. **Saurauia glabra** (R. & P.) Soejarto, comb. nov.—Basionym: *Palaua glabra* R. & P., Syst. Veg. Fl. Peruv. et Chilens. 182. 1798.—Type: *Pavon s.n.* (G, lectotype; GH, photo). Figure 8.

Apatelia glabrata DC., Mém. Soc. Phys. Genève 1: 428. 1822; Prodr. 1: 526. 1824.

Sauravia glabrata Steud., Nomencl. Bot. ed. 2, 2: 516, nom. nud. (excl. syn. *Sauravia serrata* DC.).

Saurauja glabrata Choisy, Mém. Soc. Phys. Genève 14: 117. 1855.

Saurauia aequatoriensis Sprague var. *boliviana* Busc., Malpighia 30: 35. 1927, p. p.

Shrubs or trees to 15 m. tall; glabrescent. Branchlets slender, terete, glabrescent to sparingly strigillose pubescent, smooth. Leaves clustered behind tip of branchlets; blades elliptic to elliptic-obovate, acute to very shortly acuminate at apex, cuneate to obtuse at base, serrulate along margins, 10-18 cm. long, 5-8 cm. wide, chartaceous, smooth and glossy above, secondary veins 10-15 pairs, tertiary veins immersed, scarcely more prominent than lesser venation, scattered strigillose pubescent to glabrescent along and between veins above and beneath, villous-barbate at axils of secondary veins beneath; petioles 1-2.5 cm. long, 1-1.5 mm. in diameter, glabrescent. Inflorescences somewhat straight, (15-)25-50(-80)-flowered, 5-13 cm. long, 2.5-6 cm. wide, abundantly to sparingly pubescent, trichomes of stellate (especially along lesser ramification) mixed with tuberculate-strigillose types, primary peduncle 2-8 cm. long, bracts linear, to 5 mm. long, rarely foliaceous, to 25 mm. long. Flowers 10 mm. broad, buds to 3 mm. in diameter, pedicels to 5 mm. long, bracteoles linear, to 3 mm. long; sepals 5, elliptic to orbicular-obovate, obtuse to rounded, 2.5-4 mm. long, 2-2.5 mm. wide, exposed parts in bud pulverulent with trichomes of appressed-stellate mixed with shaggy-strigillose types, imbricated parts glabrous, all glabrous inside, marginally irregularly ciliolate, especially along apex; petals 5, obovate to orbicular-obovate, rounded and often deeply incised, 5-6.5 mm. long, 3.5-5 mm. wide; stamens 50-80, filament 2 mm. long, anther 0.5-0.85 mm. long; ovary 4-5-loculed, ovoid, 4.5-sulcate, glabrous, styles 4-5, 1-1.5 mm. long, stigmas subcapitate. Berries unknown.

Distribution.—Peru (Department of Huanuco).

Specimens examined.—PERU, HUANUCO: Muña (?), fl., *Pavon s. n.* (G, GH, photos), fl., *Pavon s. n.* (F, fragment; G, P), veg., *Pavon s. n.* (F, leaf fragment); Chinchao, July, fl., *Sawada 97* (F); no loc., fl., *Pavon s. n.* (FI), ? *Pavon s. n.* (BM).

For technical reasons, it has been necessary to propose the above new combination. Were *Palaua glabra* R. & P. synonymous with *Saurauia serrata* DC. (1822), the correct name for this taxon must be *S. serrata* DC., as it was treated by Sprengel (1827), not *S. glabrata* Steud. (1841). However, *S. serrata* DC., a Mexican species, is taxonomically distinct from *P. glabra* R. & P. Since *S. glabrata* Steud. is a nomen nudum, while *S. glabrata* Choisy is a later homonym, they must be rejected according to the Code.

10. **Saurauia yasicae** Loes., Bot. Jahrb. 23: 125. 1896; Hunter, Ann. Missouri Bot. Gard. 58: 84. 1966, pro syn.—Type: *Rotschuch 246* (not seen). Illustration: Ann. Missouri Bot. Gard. 58: 85. 1966.

Saurauja herbert-smithii Rusby, Descr. 300 New Sp. S. Amer. Pl. 57. 1920.—Type: *H. H. Smith 857* (A, BM, F, G, GH, K, L, MICH, NY, P, S, US).

Saurauia leucocarpa Schlecht. var. *smithiana* Busc., Malpighia 29: 232. 1922.—Type: *Turckheim 1445* (not seen).

Saurauia yasicae var. *laevigatae* Busc., l. c. 232.—Type: *Tonduz 11453* (G, L).

Saurauia yasicae var. *laevigatae* fma. *veranii* Busc., l. c. 413.—Type: *Tonduz 13147* (G, P).

Saurauia smithiana Busc., l. c. 445. *pl. 3, fig. 1.*—Type: *H. H. Smith 857.*

Saurauia pseudopittieri Busc., l. c. 30: 97. 1927.—Type: *Pittier 11247* (not seen).

Saurauia zetekiana Standl., J. Arnold Arbor. 11: 124. 1930.—Type: *Bangham 578* (G, fragment).

Saurauia belizensis Lundell, Field & Lab. 13: 7. 1945.—Type: *Gentle 4439* (not seen).

Trees to 30 m. tall, diameter to 30 cm. at base; glabrescent to sparingly pubescent. Branchlets slender, terete, glabrescent to scattered pubescent, trichomes tuberculate. Leaves crowded behind tip of branchlets; blades obovate to elliptic, shortly acuminate at apex with acumen to 10 mm. long, cuneate to subattenuate at base, serrulate to serrate along margins, 6-22 cm. long, 2-10 cm. wide, membranaceous to rarely chartaceous, in dry state dark brown to sooty above, olive to olive-brown beneath, somewhat glossy and smooth above, secondary veins 5-15(-18) pairs, tertiary veins immersed, scarcely more prominent than to indistinguishable from lesser venation, glabrescent above, scattered pubescent with trichomes of clustered and tufted to setose-tufted types along major veins beneath, lower epidermis glabrous and somewhat pustulate; petioles (0.5-)1-3 cm. long, (0.5-)2.5 mm. in diameter, terete, glabrescent. Inflorescences straight and often spreading, (20-)40-150-flowered, (3-)5-20 cm. long, (1.5-)3-10 cm. wide, glabrescent to abundantly stellate to tufted pubescent (particularly along lesser ramification and pedicels), primary peduncle (1.5-)3-10 cm. long, bracts subulate, to 5 mm. long, rarely foliaceous, to 35 mm. long. Flowers 7-10 mm. broad, buds to 3 mm. in diameter, pedicels 1-6 mm. long; sepals (3-)4(-5), oblong-ovate to suborbicular, obtuse to rounded, 2-3 mm. long, 1.5-3 mm. wide, exposed parts in bud abundantly stellate pubescent, imbricated parts glabrous, all glabrous medially inside, but stellate pubescent laterally and on upper portion, marginally ciliolate; petals (3-)4(-5), white, oblong-obovate to obovate, rounded, 3-4.5 mm. long, 2-4 mm. wide; stamens (18-)20-30(-35), filament 1.5-2.5 mm. long, anther 1-1.5 mm. long; ovary (3-)4(-5)-loculed, globose, (3-)4(-5)-sulcate, glabrous, styles (3-)4(-5), obsolete to 4 mm. long, stigmas simple to capitate. Berries green to dirty white, (3-)4(-5)-loculed, subglobose, 2-3 mm. across, 5-sulculate.

Habitat.—Virgin and deep forest, advanced secondary forest, wooded valley, in coffee plantation with original forest trees, thicket along stream, forested riverbank, hilltops and slopes, roadside, shady as well as sunlit areas, at altitudes of 30-1,300 m.

Distribution.—Mexico (Chiapas, Oaxaca, Tabasco), British Honduras (Cayo, Stann Creek, Toledo), Guatemala (Alta Vera-paz, Quezaltenango, Retalhuleu, Suchitepequez), Honduras (Atlantida,

Cortés, Santa Barbara, Yoro), Nicaragua (Matagalpa), Costa Rica (Alajuela, Cartago, Limon, Pantarenas, Tilaran), Panama (Canal Zone, Panama), Venezuela (Merida, Barquisimeto), Colombia (Antioquia, Magdalena, Cundinamarca, Tolima).

Vernacular names.—*Jahoncillo, Wild orange* (British Honduras: Gentle), *Chulindron* (Honduras: Von Hagen).

Specimens examined.—BRITISH HONDURAS, CAYO DISTR.: Humming Bird Hwy., 31-mile section, Nov., fr., *Gentle 8907, 8923* (both in G). STANN CREEK DISTR.: Humming Bird Hwy., July, fr., *Gentle 8254* (G).

GUATEMALA, QUEZALTENANGO: Colomba, Sept., fl., *Skutch 1335* (G).

COSTA RICA: forests of Tuis, Nov., fl., *Tonduz 11453* (G, L); Las Vueltas, Tecurrique, Jan., fl., *Tonduz 13147* (G, P).

PANAMA, COCLE: Anton Valley, vic. of Finca Tomas Arias, Aug., fl., *Allen 3630* (G, K, U), N. of Anton Valley, Sept., fl., *Allen 3706* (G). No locality, July, fl., *Aviles 999* (G), Sept., fr., *Bangham 578* (G).

VENEZUELA, MERIDA: El Vigia to Cano Amarillo, Feb., fl., *Bernardi 1905* (FI, NY). BARQUISIMETO: S. of Barquisimeto, Cabudare, Serranias of Terepalma, Lara, Aug., fl., *Saer 637* (VEN).

COLOMBIA, MAGDALENA: Sierra Nevada of Santa Marta, Cincinnati region, Cerro Quemado, fl., *Espina & Giacometo A55* (F), Bellavista region, fl., *A70* (F); trailside near San Andrés, NW. slope, June, fl., *Kernan 132* (NY, P); Santa Marta, ? Cacagualito, June, fl., *Smith 857* (A, BM, F, G, GH, K, L, MICH, NY, P, S, US), March, fl., *1774* (A, BM, F, G, GH, L, NY, P, S, U, UC, US). ANTIOQUIA: Anori, Providencia, between the hydroelectric plant and Dos Bocas, July, fl. fr., *Soejarto 2847, 2934, 2941* (all at COL, F, UNIV. OF ANTIOQUIA*), May, fl., *4030, 4031, 4032, 4140, 4142-4146, 4149* (all at UNIV. OF ANTIOQUIA), fl. fr., *4148* (UNIV. OF ANTIOQUIA); no precise locality, Nov., fl., *Espinal 769* (ECON, UV). CUNDINAMARCA: Pacho, La Palma Highway, Aug., fl., *Haught 6081* (US); about 75 km. by highway NW. of Bogota, at bridge across Rio Negro on highway between Pacho and La Palma, March, fl., *Little, Jr. 7370* (NY, US). TOLIMA: Mariquita, road to Fresno, July, fl., *Uribe-Uribe 3000* (COL, ECON, GH). NO PRECISE LOCALITY: Nueva España, fl., *Pavon s. n.* (G).

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humid rocky riverbank, road cut, shady and open areas, at altitudes of 800-2,000(-3,600?) m.

Distribution.—Ecuador (Provinces of Tungurahua, Napo-Pastaza, Santiago-Zamora).

Vernacular names.—*Moco* (Tungurahua: Heinrichs).

Specimens examined.—ECUADOR, TUNGURAHUA: vic. of Ambato, Aug., fl., *Rose & Rose 22377* (NY, US); Baños and vic., Jan., fl., *Heinrichs 268* (G, NY, Z), March, fl., *Mexia 6999* (F, UC), fl., *Penland & Summers 99* (F, US), July, fl., *Sandeman 23* (K), April, fl., *Benoist 4229* (P), *4200* (P), fr., *Sodiro s. n.* (P); road Baños to Puyo, bank of Pastaza River, Aug., fl. fr., *Soejarto & Hernandez 1342* (ECON); Mt. Tungurahua, southwest slope, headwater of Agua de Oro, April, fl., *Heinrichs 855* (B, G, NY, Z), northern slope, Jan., fl., *Rimbach 46* (K, MICH), Oct., fr., *270* (F, S); valley of Pastaza River, road Baños to Cashurco, Sept., fl., *Hitchcock 21753* (GH, NY, US); no locality, Hacienda La Merced, Feb., fr., *Mexia 7008* (UC, US), Jan., fl. fr., *Rimbach 496* (S). SANTIAGO-ZAMORA: Huamboya, Feb., fl., *Solis 7518* (F).

NO PRECISE LOCALITY: In Andibus Ecuadorensibus, fl., *Spruce 4989* (BM, F, G, GH, NY, P, S).

S. aequatoriensis is fairly well represented in the areas surrounding Baños (Tungurahua and Napo-Pastaza), where the plants commonly grow in shady and humid places, particularly in the forested area along the Pastaza river, at altitudes of 1,300-1,800 m. This is probably the area where the type was collected by Spruce. The altitude given by Heinrichs *(Heinrichs 855)* as 3,600-3,800 m. (headwater of Agua de Oro) is questionable, because this is too high for the species. *Solis 7518,* the only record from Santiago-Zamora, differs from specimens collected in the Tungurahua and Napo-Pastaza areas in its glabrous, moderately branched inflorescences, and its smaller flowers with completely glabrous sepals.

12. **Saurauia adenodonta** Sleumer, Notizbl. 15: 372. 1941.—Type: *Schultze-Rhonhof 2914* (K, lectotype). Figure 9.

Shrubs; sparingly pubescent. Branchlets terete, densely tuberculate-strigose pubescent. Leaves clustered behind tip of branchlets; blades oblong-elliptic to oblong-obovate, shortly and abruptly acuminate at apex with acumen to 10 mm. long, broadly cuneate to rarely oblique at base, finely and distantly serrulate along margins, 12-23 cm. long, 5-8 cm. wide, chartaceous, glossy and smooth above, secondary veins 16-20 pairs, tertiary veins immersed, scarcely more prominent than lesser venation, glabrous except for distantly scattered tuberculate trichomes along veins

above, scattered to sparingly pubescent with trichomes of radiate to clustered (along veins) and tuberculate-strigillose types (along midrib) beneath; petioles 1-2.5 cm. long, 1-2.5 mm. in diameter, densely tuberculate pubescent. Inflorescences somewhat straight, 100-ca. 200-flowered, 9-22 cm. long, 2-7 cm. wide, abundantly pubescent with trichomes of radiate to stellate mixed with shaggy-strigillose to shaggy-strigose types, primary peduncle 4.5-9.5 cm. long, bracts linear, to 3.5 mm. long, very rarely foliaceous, to 11 mm. long. Flowers 7-9 mm. broad, buds ellipsoidal (sepals become fully open and extended, and curved outward in mature buds), to 3.5 mm. long, to 2.5 mm. in diameter, pedicels to 3 mm. long, bracteoles linear, to 2 mm. long; sepals 5, elliptic to oblong-elliptic, subacute to obtuse, 3-3.5 mm. long, 2-2.5 mm. wide, exposed parts in bud densely pubescent with trichomes of stellate and strigillose types, imbricated parts stellate pubescent, all abundantly to densely stellate pubescent on upper half but glabrous on lower half inside, marginally ciliolate; petals 5, oblong to elliptic-oblong, rounded, 3.5-4 mm. long, 1.5-2.5 mm. wide; stamens 20-30, filament 2 mm. long, anther 1-1.5 mm. long; ovary 3-5-loculed, subglobose, 3-5-sulculate, glabrous, styles 3-5, obsolete to 3.5 mm. long, stigmas simple to subcapitate. Berries unknown.

Distribution.—Ecuador (Province of Napo-Pastaza).

Specimens examined.—ECUADOR, NAPO-PASTAZA: Region of Pastaza River, Mera, March, fl., *Lugo 11* (S), fl., *Schultze-Rhonhof 2914* (K).

S. adenodonta is easily distinguished from all other Ecuadorian species by its small flowers (less than 10 mm. broad), its small and ellipsoidal flower buds, and its glabrescent leaves. The species is apparently related to *S. laevigata*.

13. **Saurauia strigillosa** Tr. & Pl., Ann. Sci. Nat. ser. 4, 18: 266. 1862; Prodr. Fl. Nov. Granat. 1: 263. 1862.—Type: *Triana s. n.* (G, lectotype; F-fragment, P, isolectotypes; GH, US, photos). Figure 11.

Saurauia strigillosa var. *microphylla* Busc., Malpighia 30: 107. 1927.—Type: *Goudot s. n.* (P; US, photo).

Saurauia floribunda Benth. ex Sprague var. *laevigata* Busc., l. c. 28: 113. 1917.—Type: *Goudot s. n.* (P; US, photo).

Trees; sparingly pubescent. Branchlets slender, terete, sparingly strigillose pubescent. Leaves crowded behind tip of branchlets; blades elliptic to oblanceolate or oblong-obovate, abruptly and very shortly acuminate at apex, narrowly cuneate at base, serrulate along margins, 6-15 cm. long, 2-5 cm. wide, chartaceous to subcoriaceous, glossy and smooth above, in dry state sooty above, dark olive-brown beneath, secondary veins 10-15 pairs, tertiary veins immersed, scarcely more prominent than lesser venation, scattered to sparingly strigillose pubescent along major veins and scattered stellate pubescent to glabrescent along minor veins with glabrous and pustulate epidermis above and beneath; petioles 1-2 cm. long, 1-1.5 mm. in diameter, terete, sparingly strigillose pubescent. Inflorescences little branched, often somewhat flexuous, (3-)10-20-flowered, (2-)5-11 cm. long, 2-4 cm. wide, abundantly pubescent

with trichomes of strigillose and stellate types, primary peduncle (1-)2-6 cm. long, bracts subulate, to 4 mm. long. Flowers 15-18 mm. broad, buds to 5 mm. in diameter, pedicels 3-6 mm. long, bracteoles triangular, to 2 mm. long; sepals 5, elliptic to oblong, obtuse, 4-5 mm. long, 2.5-3.5 mm. wide, exposed parts in bud abundantly to densely pubescent with trichomes of strigillose and stellate types, imbricated parts densely stellate pubescent, all densely stellate pubescent inside, marginally ciliolate; petals 5, white, oblong to oblong-obovate, rounded to often incised or tridentate, 6-8 mm. long, 4-5 mm. wide; stamens 20-30, filament 2.5 mm. long, anther 2 mm. long; ovary 5-loculed, subglobose, 5-sulcate, glabrous, styles 5, 1-3.5 mm. long, stigmas simple to capitate. Berries unknown.

Habitat.—Mountain forest, subparamo, along creeks, at altitudes of 1,500-2,800 m.

Distribution.—Colombia (Departments of Antioquia, Quindio, Tolima).

Vernacular Names.—*Chachafruto* (Quindio: Goudot).

Specimens examined.—COLOMBIA, ANTIOQUIA: Paramo of Sonson, Jan., fl., *Daniel 3463* (US). QUINDIO: Dec., fl., *Goudot s. n.* (FI, P; US, photo). TOLIMA: Mariquita, fl., *Triana s. n.* (G, lectotype; F-fragment, K, P, isolectotypes; GH, US, photos); Ibague, La Palmilla, Nov., fl., *Goudot s. n.* (P; US, photo).

14. **Saurauia laevigata** Tr. & Pl., Ann. Sci. Nat. ser. 4, 18: 267. 1862; Prodr. Fl. Nov. Granat. 1: 264. 1862; Hunter, Ann. Missouri Bot. Gard. 53: 84. 1966, p. p. min.—Type: *Triana s. n.* (G, lectotype; P, isolectotype; GH, photo). Figure 10.

Trees; sparingly pubescent to glabrescent. Branchlets slender, terete, scattered tuberculate pubescent to glabrescent. Leaves obovate to oblong-obovate, very shortly and abruptly acuminate at apex, cuneate at base, rarely oblique, distantly and finely serrulate along margins, 10-24 cm. long, 5-10 cm. wide, chartaceous, glossy and smooth above, in dry state sooty above, dark dull gray-brown beneath, secondary veins 12-16 pairs, tertiary veins somewhat immersed, scarcely more prominent than lesser venation, scattered floccose pubescent along major veins but mostly glabrous above, scattered tuberculate pubescent to glabrescent along midrib but mostly glabrous with pustulate epidermis beneath; petioles 2-4 cm. long, 2-3 mm. in diameter, somewhat terete, smooth and glabrescent. Inflorescences straight, 30-ca. 100-flowered, 13-22 cm. long, 4-6 cm. wide, glabrescent along lower portion, abundantly pubescent with stellate trichomes along lesser ramification, primary peduncle 5-10 cm. long, bracts subulate, to 3 mm. long. Flowers 15 mm. broad, buds to 5 mm. in diameter, pedicels to 5 mm. long, bracteoles subulate, to 3 mm. long; sepals 5, outer two oblong to oblong-ovate, obtuse, 3-3.5 mm. long, 2 mm. wide, imbricate one and inner two suborbicular, rounded, 3-4 mm. long, 3-3.5 mm. wide, all abundantly stellate pubescent throughout, marginally and apically ciliolate; petals 5, oblong-obovate, rounded, 12-14 mm. long, 4-5.5 mm. wide; stamens 20-30, filament 3.5-4.5 mm. long, anther 2.5 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, 1.5 mm. long, stigmas simple. Berries unknown.

Habitat.—Forest, at altitudes of ca. 1,400 m.

Distribution.—Colombia (Departments of Antioquia and Tolima).

Vernacular names.—*Dulumoco* (Antioquia: Uribe-Uribe).

Specimens examined.—COLOMBIA, ANTIOQUIA: Nariño, Quebradita El Oso, Jan., fl., *Uribe-Uribe 1912* (COL, ECON). TOLIMA: Mariquita, fl., *Triana s. n.* (G, lectotype; BM, K, P, isolectotypes; GH, photo).

Based upon studies of the type specimen, *S. laevigata* is here defined in a narrower sense than that treated by Hunter (1966), who included in it *S. yasicae* and its synonyms as well. The two species are taxonomically distinct and their separation is warranted by the following characteristics:

	S. laevigata	*S. yasicae*
Leaves:	Usually large, subcoriaceous to chartaceous	Usually small, membranaceous
Lateral veins:	10-15 pairs	5-15(-18) pairs
Foliar trichome types:	Strigillose and stellate	Clustered to tufted or setose-tufted
Flowers per inflorescence:	(3-)10-20	(20-)40-150
Flowers:	ca. 15 mm. broad, pentamerous	7-10 mm. broad, tetramerous
Sepals (both surfaces):	Abundantly pubescent	Glabrous to sparingly pubescent
Filament:	3.5-4.5 mm. long	1.5-2.5 mm. long
Anther:	Linear, ca. 2.5 mm. long	Cordate, 1-1.5 mm. long

IV. Ser. PARVIFLORAE Soejarto, ser. nov.

Brachitrichae Busc., Malpighia 25: 220. 1912, p. p. min.
Gynogynae Busc., l. c. 221, p. p. min.
Stenobasicae Busc., l. c. 221, p. p. min.

Plantae glabrescentes flores parvos habentibus, sepala omnino glabri intus et omnino glabri vel partim et parce pubescentes extus.

1. Plants glabrous throughout, secondary veins 35-37 pairs; Colombia ..... 15. *S. multinervis*
1. Plants sparingly pubescent (*S. chiliantha* copiously pubescent), secondary veins less than 30 pairs.
   2. Flowers 20 mm. or more broad, 6-20 per inflorescence, secondary veins 15-18 pairs ..... 16. *S. schultesiana*
   2. Flowers 7 to less than 20 mm. broad.
      3. Leaves villous-barbate at axils of secondary (often tertiary) veins beneath; Peru ..... 17. *S. peruviana*
      3. Leaves not villous-barbate beneath.

4. Lower leaf surface densely to abundantly stellate pubescent, epidermis usually obscured by pubescence ..... 18. *S. chiliantha*
4. Lower leaf surface glabrescent to sparingly pubescent, trichomes mostly not of stellate type, epidermis not obscured by pubescence.
   5. Texture of leaves strongly coriaceous, often very rigid and brittle, leaf margins aculeo-serrulate with hard and sharp-pointed serrulation.
      6. Leaf blades 10-23 cm. long, 3.5-6.5 cm. wide, secondary veins 14-16 pairs, major veins abundantly pubescent beneath, trichomes to 4 mm. long, flowers 5-8 mm. broad; Peru ..... 19. *S. solitaria*
      6. Leaf blades 20-41 cm. long, 13-17 cm. wide, secondary veins 20-25 pairs, major veins sparingly pubescent beneath, trichomes to 2 mm. long, flowers 10-15 mm. broad; Colombia 20. *S. micayensis*
   5. Texture of leaves chartaceous to membranaceous, rarely subcoriaceous, leaf margins serrulate, serrulations not spiny, often terminating in setae.
      7. Sepals glabrous throughout.
         8. Inflorescences 15-60-flowered, stamens 20-35, leaf texture chartaceous to membranaceous; Peru ..... 21. *S. natalicia*
         8. Inflorescences 40-200-flowered, stamens 40-70, leaf texture subcoriaceous; Colombia ..... 22. *S. parviflora*
      7. Sepals partly to completely pubescent outside.
         9. Inflorescences 20-150-flowered, flowers 7-10 mm. broad, stamens 15-20, leaves scattered radiate pubescent beneath; Colombia ..... 23. *S. pseudoleucocarpa*
         9. Inflorescences 50-500-flowered, flowers 10-19 mm. broad, stamens 45-85, leaves sparingly sericeous-strigose pubescent; Bolivia ..... 24. *S. spectabilis*

15. **Saurauia multinervis** Soejarto, Bot. Mus. Leafl. 22: 266. 1969.—Type: *Idrobo & Fernandez 54* (US, holotype; COL, isotype). Figure 12.

Shrubs to 2 m. tall, many-branched; glabrous. Leaf blades elongate-obovate, cuspidate at apex, broadly cuneate to obtuse at base, dentate-serrate with minute and sharp-pointed serrations along margins, 30-42 cm. long, 12-14 cm. wide, coriaceous, dirty dark olive-brown above in dry state, brownish olive beneath, laevigate and smooth above, secondary veins 35-37 pairs, tertiary veins elevated, more prominent than lesser venation, both surfaces glabrous; petioles 1-2 cm. long, 3-5 mm. in diameter, glabrous. Inflorescences straight, ca. 150-flowered, 23 cm. long, 15 cm. wide, glabrous, primary peduncle 1.5 cm. long, bracts linear, to 5 mm. long. Flowers not known. Fruits laxly distributed, berries 5-loculed, globose, to 6 mm. in diameter, 5-sulcate, glabrous; pedicels 4-8 mm. long, bracteoles linear to 3 mm. long; persistent sepals 5, oblong-elliptic to ovate, obtuse, 5-6.5 mm. long, 3-4.5 mm. wide, all glabrous throughout, marginally entire to irregularly ciliolate; persistent styles 5, 4.5-5 mm. long, stigmas capitate.

Habitat.—Altitude of 2,000 m.

Distribution.—Colombia (Department of Cauca).

Vernacular names.—*Lulumoco* (Cauca: Idrobo & Fernandez).

Specimens examined.—COLOMBIA, CAUCA: Cordillera Occidental, eastern slope, El Tambo, Aug., fr., *Idrobo & Fernandez 54* (US, holotype; COL, isotype).

16. **Saurauia schultesiana** Soejarto, Bot. Mus. Leafl. 22: 267. 1969.—Type: *Pennell 10501* (NY, holotype). Figure 13.

Trees; copiously to sparingly pubescent. Branchlets terete, abundantly pubescent with rusty strigose to setose trichomes, young leaves and shoot deep brown in dry state. Leaves crowded around tip of branchlets; blades elliptic to oblong-obovate, acuminate at apex with acumen to 15 mm. long, cuneate at base, serrulate along margins, 14-18 cm. long, 7-8 cm. wide, subcoriaceous, in dry state dark dirty brown above, grayish olive-brown beneath, scarcely scabrous above and beneath, secondary veins 15-18 pairs, tertiary veins elevated, more prominent than lesser venation, sparingly to abundantly pubescent beneath, with trichomes of setose to setulose mixed with radiate types along and between minor veins and of strigose types along major veins; petioles ca. 2 cm. long, 2-3 mm. in diameter, half-terete, abundantly rusty strigose pubescent. Inflorescences straight, 6-20-flowered, 13-30 cm. long, 2-7 cm. wide, pulverulent, abundantly scurfy-strigose pubescent, primary peduncle 8-15 cm. long, bracts broadly triangular to suborbicular, 10-15 mm. long, 5-7 mm. wide, glabrous. Flowers 20-25 mm. broad, buds to 9 mm. in diameter, pedicels 5-10 mm. long, bracteoles broadly triangular, to 10 mm. long; sepals 5, outer two trullate to oblong-ovate, subacute, 10-12 mm. long, 6-7 mm. wide, imbricate one suborbicular, 10-12 mm. long, 8-9 mm. wide, inner two suborbicular to orbicular-oblong, 10-14 mm. wide, all glabrous to medially sparingly strigillose pubescent outside, glabrous inside, marginally entire to apically ciliolate; petals 5, white, subquadrangular to spatulate, rounded, 15-19 mm. long, 9-11 mm. wide; stamens 25-35, filament 4-5 mm. long, anther 2.5-3 mm. long; ovary 5-7-loculed, globose, 5-7-sulcate, glabrous, styles 5-7, to 7.5 mm. long, stigmas capitate. Berries 5-7-loculed, globose, to 6 mm. across (immature), 5-7-sulcate.

Habitat.—Mossy forest at altitudes of 3,200-3,400 m.

Distribution.—Colombia (Department of Caldas).

Specimens examined.—COLOMBIA, CALDAS: Cordillera Occidental, Cerro Tatama, Sept., fl. fr., *Pennell 10501* (NY, holotype).

The floral characters of *S. schultesiana* very much resemble those of *S. omichlophila,* but the inflorescence approaches that of *S. bullosa,* whereas the leaf pubescence is similar to that of *S. excelsa.* This combination of characters, therefore, is unique and easily sets it apart from all other species. In this connection, the following comment by Schultes (1943, p. 45), when he described *S. spinuligera* from the same locality as that of *S. schultesiana,* is noteworthy: "The presence of such an extraordinarily distinct species of *Saurauia* on

Cerro Tatama, which is in fact, an island-mountain isolated from neighboring elevations, would seem to suggest that more interesting endemic species or varieties of this genus might be found there."

17. **Saurauia peruviana** Busc., Malpighia 27: 319. *pl. 8, fig. 15.* 1916.—Type: *Haenke s. n.* (COL, GH, photos).

Saurauja scabra Poepp. ex Choisy, Mém. Soc. Phys. Genève 14: 116. 1855, excl. syn. *Palaua biserrata* R. & P. and *P. glabrata* DC.—Type: *Poeppig 127* (also numbered *Poeppig 1694*) (G, holotype; F, GH, P, U, isotypes; COL, NY, photos).

Saurauia pseudoscabra Busc., Malpighia 28: 1. 1917.—Type: *Weberbauer 842* (COL, GH, NY, photos; photo in NY labeled as *942*)

Saurauia scabra Poepp. ex Choisy var. *boliviana* Busc., Malpighia 27: 501. 1916.—Type: *Weddell 4206* (P, lectotype).

Saurauia floribunda Benth. ex Sprague var. *peruviana* Busc., Malpighia 28: 119. 1917.—Type: *Mathews s. n.* (G, K).

Saurauia weberbaueri Busc., Malpighia 30: 148. *pl. 5, fig. 8.* 1927.—Type: *Weberbauer 4454* (COL, NY, photos).

Saurauia pseudoparviflora Busc., Malpighia 30: 158, 1917, p. p. maj. typ. incl.—Type: *Bang 387A* (G, lectotype; F, MICH, NY, US, isolectotypes).

Saurauia coroicoana Busc., Malpighia 30: 197. *pl. 9, fig. 17.* 1927.—Type: *No collector s. n.* (P, lectotype).

Saurauia pyramidata Sleumer, Notizbl. 12: 145.—Type: *Buchtien 2205* (US, lectotype; NY, isolectotype).

Saurauia scabriuscula Macbr., Fl. Peru 3A(2): 683. 1956.—A new name for *S. scabra* Poepp. ex Choisy.

Shrubs to 3 m. tall; copiously pubescent. Branchlets slender, terete, abundantly to sparingly strigose to shaggy-strigose pubescent. Leaves clustered behind tip of branchlets; blades obovate to oblong-obovate, very shortly and abruptly acuminate to acute at apex, cuneate at base, serrulate along margins, 10-18(-25) cm. long, 3-6(-10) cm. wide, chartaceous, somewhat scabrous above, secondary veins 13-20 pairs, tertiary veins elevated, more prominent than lesser venation, sparingly to abundantly setulose to strigillose pubescent along and between minor veins (trichomes often reduced to mere warts) and abundantly appressed-setose to strigose pubescent along major veins above, abundantly pubescent beneath with trichomes of setulose to setose mixed with stellate to stellate-setose or shaggy types along and between veins, villous-barbate at axils of secondary veins beneath; petioles 1.5-3(-6) cm. long, 1.5-2 mm. in diameter, abundantly appressed-setulose pubescent. Inflorescences somewhat straight, (25-)50-ca. 200(-300)-flowered, 3-18 cm. long, 2-7 cm. wide, densely to abundantly setulose to shaggy-setulose pubescent, primary peduncle 1-7 cm. long, bracts

triangular, to 3 mm. long. Flowers 5-8 mm. broad, buds to 3.5 mm. in diameter, pedicels 1-2 mm. long, bracteoles triangular, to 1.5 mm. long; sepals 5, orbicular ovate to suborbicular, subacute to rounded, 1.5-2.5 mm. long, 1-2 mm. wide, exposed parts in bud usually glabrous to rarely pubescent with trichomes of stellate to shaggy types, imbricated parts glabrous, all glabrous inside, marginally ciliolate to prominently ciliate; petals 5, white, oblong, rounded, 3-5 mm. long, 2.5-5 mm. wide; stamens 15-30, filament 2 mm. long, anther 1 mm. long; ovary 3-5-loculed, ovoid, 3-5-sulculate, glabrous, styles obsolete to 3 mm. long, stigmas simple to subcapitate. Berries 3-5-loculed, subglobose, to 4 mm. across, 3-5-sulcate.

Habitat.—Wet wooded slope, edge of brushy ravine in clearing, forest remnant in cleared land, Andean forest, edge of forest on sandy soil, at altitudes of 750-2,700 m.

Distribution.—Ecuador (Province of Santiago-Zamora), Peru (Departments of Cajamarca, Amazonas, Huanuco), Bolivia (Provinces of La Paz and Cochabamba).

Specimens examined.—ECUADOR, SANTIAGO-ZAMORA: 18 km. ENE. of Loja, Rio San Francisco, Canillones, Feb., fl., *Fosberg 23145* (NY, P, US).

PERU, CAJAMARCA: Colassay, Oct., fl., *Woytkowski 6943* (GH). AMAZONAS: Bongara, Jalca Zone along Shipasbamba-Pomacocha trail, June, fl., *Wurdack 1112* (F, NY, UC, US); Chachapoyas, fl. fr., *Mathews s. n.* (BM, G, MA). HUANUCO: Cuchero, fl., *Poeppig 127* (=*Poeppig 1694*) (BM, F, G, GH, HAL, L, NY, P; COL, photo); Chinchao, veg., *Rivero s. n.* (P). NO PRECISE LOCALITY: fl., *Haenke s. n.* (COL, GH, photos); fl., *Weberbauer 842* (COL, NY, photos), *4454* (NY, photo).

BOLIVIA, LA PAZ: Murillo, in ravine of Coroico, fl., *No Collector s. n.* (P); Yungas, fl. fr., *Bang 387A* (F, G, K, MICH, NY, US), Dec., fl., *Mexia 4310* (GH, UC, US), fl., *Rusby 483* (F, MICH, NY, US), *Weddell 4206* (P). COCHABAMBA: Chapare, Palmar, April, fl., *Cardenas 5992* (US); Antahuacana, Espiritu Santo, 160 km. NE. of Cochabamba, June, fl., *Buchtien 2205*, fr., *2222* (both in NY, US). NO PRECISE LOCALITY: Unduavi, Oct., fl., *Rusby 506* (MICH, NY).

NO LOCALITY: fl., *Pavon s. n.* (FI).

S. scabra Poepp. ex Choisy is a homonym of *S. scabra* (HBK.) Dietr. (1843), and must be rejected according to the Code. The specific name *S. scabriuscula* proposed by Macbride (1955) is nomenclaturally superfluous, because an earlier name, *S. peruviana* Busc. (1916), based upon a different type *(Haenke s. n.)*, but which is

taxonomically synonymous, is available. Therefore, the correct name of this taxon is *Saurauia peruviana* Busc.

Bang 387 is the type of *S. pseudoparviflora* Busc. Another collection, also labeled *Bang 387*, was described by Buscalioni as *S. rusbyi* (non Britton) var. *glabrata* Busc., and still another *Bang 387* was described as *S. rusbyi* (non Britton) var. *spectabilis* Busc. fma. *macrophylla* Busc. Another collection, *Bang s. n.,* was described by Rusby as *S. brevipes,* treated here as a synonym of *S. spectabilis* Hook. Careful examination of all Bang's collection revealed that, first, there appear to be two different elements erroneously labeled *Bang 387;* second, *S. rusbyi* (non Britton) var. *glabrata* Busc., *S. rusbyi* (non Britton) var. *spectabilis* Busc. fma. *macrophylla* Busc., and *S. brevipes* Rusby are synonymous. For the purpose of clarity, a new number, *Bang 387A*, has been assigned to the first group of specimens that represents the type of *S. pseudoparviflora* Busc., while another number, *Bang 387B,* has been assigned to the second group that represents the type of *S. rusbyi* var. *glabrata* Busc., *S. rusbyi* var. *spectabilis* Busc. fma. *macrophylla* Busc., and *S. brevipes* Rusby.

Due to the wide distribution of *S. peruviana,* a considerable morphological variation exists between the populations, one of the reasons for the long synonymy. This variation is summarized as follows. *Poeppig 127* has relatively small leaves with unbranched multicellular trichomes (setulose type) on the lower surface, short, little-branched, few-flowered inflorescences (less than 50 flowers per inflorescence), and flowers with glabrous sepals. Other Peruvian collections have branched trichomes (shaggy type) on the lower leaf surface, little- to moderately-branched, few- to many-flowered inflorescences (50-100 flowers per inflorescence), and flowers with sepals glabrous to sparingly or abundantly pubescent outside; the leaf size also varies from 11 cm. long by 4 cm. wide to 24 cm. long by 8 cm. wide. *Fosberg 23145,* the only known Ecuadorian collection, perfectly matches *Poeppig 127,* but the leaves are slightly larger and the inflorescences are many-branched and many-flowered. The Bolivian collections, particularly those referred to as *S. pseudoparviflora* Busc., have slightly larger leaves in general than the Peruvian collections, and the lower leaf surface also varies from glabrescent (with setulose trichomes along the major veins) to abundantly shaggy pubescent, with many-branched and many-flowered inflorescences, and flowers with glabrous sepals. *Buchtien 2205,* described by

Sleumer as *S. pyramidata,* has few-branched and few-flowered inflorescences, and, although Sleumer mentioned that *"ovarium parce pilosum,"* examination of the duplicate types (NY, US) shows that the ovary is glabrous.

Notwithstanding the variable nature of the populations, they do have the following combination of features, which characterize the species: (1) leaves villous-barbate pubescent on the axils of the secondary and often tertiary veins beneath (especially the Bolivian collections), (2) flowers small (5-8 mm. broad when open); (3) sepals lacking unbranched multicellular trichomes outside (glabrous on the unexposed surface in bud, and inside); (4) stamen number low (15-30).

18. **Saurauia chiliantha** R. E. Schultes, Caldasia 2: 32. 1943.—Type: *Dugand & Jaramillo 2988* (COL, holotype; GH, US, isotypes). Illustration: Caldasia 2: 35. 1943.

Saurauia kallima R. E. Schultes, Mutisia 3: 5. 1952.—Type: *Daniel 3425* (COL, holotype; MEDEL, US, isotypes).

Shrubs to small trees to 10 m. tall, crown open; copiously pubescent. Branchlets robust, terete, prominently scarred, densely setose to hirsute pubescent, often wooly to touch, trichomes very slender, long and weak, yellowish to reddish brown. Leaves clustered behind tip of branchlets; blades obovate to oblong-obovate or elongate-obovate, mucronulate-cuspidate to rounded at apex, cuneate at base, distantly setulose-serrulate with fine, stiff and sharp-pointed serrulations along margins, (10-)17-28 cm. long, (5-)7-13(-16) cm. wide, strongly coriaceous, often stiff and brittle, dark green above, gray to reddish brown beneath (in dry state light to dark gray-brown or sooty above), secondary veins 20-28 pairs, tertiary veins elevated, more prominent than lesser venation, scattered to abundantly pubescent with trichomes of tuberculate-setose, strigose and villous types along veins above, abundantly to densely pubescent with trichomes of stellate to dendroid mixed with setose to hirsute types along and between veins beneath; petioles stout, 1-3 cm. long, 3-5 mm. in diameter, canaliculate, abundantly to densely pubescent with trichomes of strigose to villous types. Inflorescences straight, often spreading, 100- to more than 500-flowered, (6-)10-20 cm. long, (2-)4-10 cm. wide, densely to abundantly pubescent with trichomes of setose to villous mixed with silvery-stellate types, primary peduncle 0.5-4(-5.5) cm. long, bracts triangular to linear, to 10 mm. long, very rarely foliaceous, to 20 mm. long. Flowers 8-10 mm. broad, buds to 4 mm. in diameter, pedicels to 3 mm. long, bracteoles linear to triangular, to 3 mm. long; sepals 5, pale green to white, suborbicular to orbicular-obovate, acute to rounded, 2.5-3.5 mm. long, 2.5-3 mm. wide, all glabrous throughout, but sometimes medially scattered strigillose pubescent outside, marginally irregularly ciliolate; petals 5, white to creamy yellow, oblong to obovate-oblong, rounded and often incised, 4-5 mm. long, 2-3 mm. wide; stamens 20-30, filament 2-2.5 mm. long, anther 1.5 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, obsolete to 4.5 mm. long, stigmas simple to subcapitate. Berries 5-loculed, subglobose, to 6 mm. across, 5-sulcate.

Habitat.—Humid mountain forest and subparamo, at altitudes of (1,900-) 2,300-2,900 m.

Distribution.—Colombia (Departments of Antioquia, Quindio, Caldas, Tolima, and Valle).

Vernacular names.—*Dulumoco* (Antioquia: Daniel).

Specimens examined.—COLOMBIA, ANTIOQUIA: Road Sonson to Alto Capiro, May, fl., *Core 770* (NY, US); road Sonson to Abejorral, May, fl., *Ewan 15756* (NY, US); road Sonson to Mesopotamia, June, fl., *Soejarto & Rivera 2044* (ECON, GH, MEDEL); Paramo of Sonson, Jan., fl., *Daniel 3425* (COL, MEDEL, US), March, fl., *Scolnik et al. 19An215* (US), June, fl., *Rivera 313, 314* (both in MEDEL), June, fl., *Soejarto & Rivera 2047, 2048* (both in ECON, GH, MEDEL); Amaga, Jan., fl., *Uribe-Uribe 1435* (COL). QUINDIO: between Circasia and Pereira, vic. of Alto El Roble, Aug., fl., *Dugand & Jaramillo 2988* (COL, GH, US). CALDAS: Vic. of Manizales, Quebrada La Minita, fl. fr., *Soejarto 2027* (ECON, GH); road Manizales to Nevado del Ruiz, vic. of Miraflores, fl., *Soejarto 2031* (ECON, GH); San Felix, near Salamina, July, fl., *Tomas 2092* (US), Oct., fl., *3121* (MEDEL). TOLIMA: Road El Libano to Murillo, km. 11 to 22, at Alto de Peñones, July, fl., *Garcia-Barriga 12263, 12269* (both in US). VALLE: Cordillera Occidental, El 18 (Cali), Aug., fl., *Espinal 1898* (ECON, US); San Antonio (W. of Cali), March, fl., *Killip & Garcia-Barriga 33929* (US). NO PRECISE LOCALITY: Novilleros-Quindio, March, fl., *André 2318* (F, K, NY).

S. chiliantha is distinguished from all other Colombian species by the following combination of characters: (1) leaves strongly coriaceous (often very rigid) and densely pubescent beneath with trichomes of stellate mixed with setose to hirsute types; (2) inflorescences very shortly pedunculate with profuse small flowers; (3) sepals glabrous or at least glabrous throughout except for the sparingly distributed strigillose trichomes on the exposed parts in bud; (4) stamens low in number (20-30). The species is abundantly represented in the lower range of the Paramo of Sonson (Antioquia) at altitudes of 2,500-2,900 m. Members of the populations from this area (described by Schultes as *S. kallima*) differ from those from Caldas (locality of the type of *S. chiliantha*) primarily in their more rigid leaves.

Several individuals collected from Sonson *(Scolnik et. al. 19An215, Rivera 314, Soejarto & Rivera 2041)* have unusually glabrescent leaves (sparingly radiate pubescent on the lower surface), whereas Garcia-Barriga's collections *(12263* and *12269)* from Tolima and Killip and Garcia-Barriga's *(33929)* from Valle have unusually

dense pubescence on the outer surface of the sepals. Aside from these differences, other characters appear constant.

19. **Saurauia solitaria** Sleumer, Notizbl. 12: 147. 1934.—Type: *Weberbauer 7067* (F, lectotype). Figure 14.

Shrubs to 2 m. tall; copiously pubescent. Branchlets slender, terete, densely and coarsely hirsute pubescent; trichomes brown to deep reddish brown, silky, upward curved, slightly swollen at base and turning gradually very slender towards the tip, to 7 mm. long. Leaves distributed from tip of to somewhat low along branchlets, blades elliptic to elongate-obovate, cuspidate to shortly acuminate at apex with hard- and sharp-pointed acumen to 15 mm. long, cuneate to obtuse at base, spiny-serrate with serrations hard- and sharp-pointed along margins, 10.5-23 cm. long, 3.5-6.5 cm. wide, firmly coriaceous, sooty to black above in dry state, reddish brown beneath, glossy and somewhat smooth above, secondary veins 14-16 pairs, tertiary veins somewhat elevated, scarcely more prominent than lesser venation, sparingly pubescent with trichomes of setulose to strigose to setose types along and between veins above and beneath; petioles 1-1.5 cm. long, 2 mm. in diameter, abundantly hirsute pubescent with trichomes of similar types and color to those along branchlets. Inflorescences straight, 40-60-flowered, 15-16 cm. long, 4.5-6 cm. wide, densely setose pubescent, primary peduncle slender, 8-9 cm. long, bracts linear, to 5 mm. long, glabrous. Flowers 8-10 mm. broad, to 3 mm. in diameter, pedicels very slender, 3-7 mm. long, bracteoles linear, to 3 mm. long, glabrous; sepals 5, elliptic to oblong-elliptic (ovate-elliptic, cf. Sleumer), obtuse to rounded, 3-3.5 mm. long, 1.8-2.5 mm. wide, all glabrous throughout, marginally entire to rather irregularly ciliate around apex; petals 5, rosy, oblong-obovate (elliptic-rotundate, cf. Sleumer), rounded and slightly incised, 4-4.5 mm. long, 2.5 mm. wide; stamens 18-22, filament 2-2.25 mm. long, anther 1-1.25 mm. long; ovary 5-loculed, ovoid, 5-sulculate, glabrous, styles 5, 1.5 mm. long, stigmas simple. Berries not known.

Habitat.—Riverbank and mountain forest at altitudes of 1,700-2,000 m.

Distribution.—Peru (Department of La Libertad).

Specimens examined.—PERU, LA LIBERTAD: Pataz, valley of Mixiollo, one of the left tributaries of Rio Huallaga, Aug., fl., *Weberbauer 7067* (F, lectotype).

20. **Saurauia micayensis** Killip, J. Wash. Acad. Sci. 16: 570. 1926.—Type: *Killip 7932* (US, lectotype; A, photo). Figure 15.

Saurauia rigidissima R. E. Schultes, Bot. Mus. Leafl. 13: 283. 1949.—Type: *Cuatrecasas 21716* (GH, holotype; COL, F, US, isotypes).

Small trees to 8 m. tall; sparingly pubescent. Branchlets stout, terete, glabrescent to abundantly pubescent with trichomes of setose to strigose types, trichomes upwards curved, gray to gray-brown, to 3 mm. long; black in dry state. Leaves clustered behind tip of branchlets; blades broadly elliptic to oblong-obovate, cuspidate to acuminate at apex with acumen to 10 mm. long, broadly cuneate to obtuse at base, serrate along

margins with serrulations rigid and sharp-pointed to prickly, 20-41 cm. long, 13-17 cm. wide, strongly coriaceous, extremely rigid and brittle, dark gray-brown above, light to ochraceous green beneath (in dry state dark olive-brown to dull gray above, dark yellowish to grayish brown beneath), subglossy and somewhat scabrous above, secondary veins strongly elevated, strongly conspicuous, (15-)20-25 pairs, tertiary veins elevated, strongly more prominent than lesser venation, glabrescent to scattered pubescent with trichomes of strigose to setose types especially along major veins above, glabrescent to scattered pubescent with trichomes of strigose to tuberculate-strigose (along major veins) mixed with clustered to stellate types (along and between minor veins) beneath; petioles robust, 2.5-5.5 mm. long, (2-)4-7 mm. in diameter, sparingly setose pubescent. Inflorescences straight, many-branched, (75-)150-500-flowered, (12-)20-42 cm. long, 9-20 cm. wide, glabrescent to sparingly pubescent with trichomes of setose to strigose types, primary peduncle 5.5-15 cm. long, very stout and conspicuously woody, to 7 mm. in diameter, bracts linear-subulate to triangular, to 11 mm. long. Flowers 10-15 mm. broad, buds to 4 mm. in diameter, pedicels 1-2 mm. long, bracteoles linear to triangular, to 4 mm. long; sepals 5, elliptic to oblong-obovate, 2.5-3.5 mm. long, 2-2.5 mm. wide, subacute to rounded, all glabrous throughout, marginally entire to ciliolate (especially at apex); petals 5, white to pinkish white, oblong, 5-7 mm. long, 3-4.5 mm. wide, obtuse; stamens 15-25, filament 2-3 mm. long, anther 1.5-2 mm. long; ovary 5-loculed, subglobose, 5-sulculate, glabrous, styles 5, obsolete to 3.5 mm. long, stigmas simple to subcapitate. Berries 5-loculed, subglobose, to 6 mm. across, 5-sulculate.

Habitat.—Humid mountain and submountain forest, at altitudes of (1,500-) 2,000-2,900 m.

Distribution.—Colombia (Departments of Valle, Cauca, Nariño).

Vernacular names.—*Moquillo* (Nariño: Mora).

Specimens examined.—COLOMBIA, VALLE: Cordillera Occidental, Los Farallones, July, fr., *Cuatrecasas 21716* (COL, F, GH, US), fl., *21802* (ECON, F); Rio Pichinde, between Quebrada de Juntas and El Recreo, Aug., fl., fr., *Cuatrecasas 8321* (US). CAUCA: Macay Valley, La Gallera, July, fl., *Killip 7932* (US; A, photo). NARIÑO: Ricaurte, road Chucunes to La Planada, June, fr., *Mora 2662* (ECON, PASTO).

The most remarkable features of this species are: (1) the strongly coriaceous to extremely rigid leaves with very prominent venation beneath, (2) the many-branched, many-flowered glabrescent inflorescences, and (3) the flowers with glabrous sepals. *S. micayensis* is apparently related to *S. parviflora,* from a lower mountain zone (1,000-1,500 m.), and *S. pseudoleucocarpa,* from the Colombian Pacific coastal zone (0-300 m.). All three species have glabrescent leaves and inflorescences, and small flowers with complete absence of unbranched multicellular trichomes on the sepals.

21. **Saurauia natalicia** Sleumer, Notizbl. 12: 144. 1934.—Type: *Weberbauer 7867* (F, lectotype; COL, photo). Figure 16.

Saurauia pseudoparviflora Busc. var. *rusbyana* Busc., Malpighia 30: 160. 1927.—Type: *Kuntze s. n.* (NY, lectotype).

Shrubs to 3 m. tall; glabrescent. Branchlets slender, terete, sparingly strigillose pubescent. Leaves clustered behind tip of branchlets; blades elliptic to obovate-elliptic, acuminate at apex with acumen to 20 mm. long, cuneate at base, serrate to serrulate along margins, 8-25 cm. long, 3-10 cm. wide, chartaceous to membranaceous, scarcely scabrous above, secondary veins (15-)20-30 pairs, tertiary veins elevated, more prominent than lesser venation, sparingly muricated to strigillose pubescent along and between minor veins and sparingly strigose pubescent along major veins above, sparingly pubescent with trichomes of tuberculate-strigillose (along minor veins) and strigose mixed with stellate types (along major veins) beneath, with pustulate epidermis; petioles slender, terete, 1.5-3.5 cm. long, 0.5-1.5 mm. in diameter, sparingly strigillose pubescent. Inflorescences loose, sparingly to abundantly strigillose pubescent, primary peduncle slender, (2-)5-8 cm. long, bracts linear, to 5 mm. long. Flowers 10-15 mm. broad, buds to 3.5 mm. in diameter, pedicels 1-5 mm. long, bracteoles linear, to 2 mm. long; sepals 5(-6), elliptic to oblong to obovate-oblong, acute to rounded, 3-4 mm. long, 2-3 mm. wide, all glabrous throughout, marginally irregularly ciliolate; petals 5(-6), white, oblong to obovate-oblong, rounded to rarely deeply incised, 6-7 mm. long, 3.5-5.5 mm. wide; stamens 20-35, filament 3 mm. long, anther 1.25-1.75 mm. long; ovary 5(-6)-loculed, subglobose, 5(-6)-sulcate, glabrous, styles 5(-6), 1-4.5 mm. long, stigmas simple to subcapitate. Berries 5(-6)-loculed, globose to obovoid, to 7 mm. across, 5(-6)-sulcate.

Habitat.—Thicket and bushwood, at altitudes of 1,600-2,500 m.

Distribution.—Peru (Department of Cuzco) and Bolivia.

Specimens examined.—PERU, CUZCO: Calca, Lacco Valley, road to Huairurum, July, fl., *Vargas 11099* (US); Quispicanchi, Marcapata Valley, near Chilechile, Feb., fl., *Weberbauer 7867* (F, lectotype; COL, photo). AYACUCHO: Choimacota Valley, Feb., fl., *Weberbauer 7567A* (BM).

BOLIVIA. NO PRECISE LOCALITY: San Miguelito, June, fl. fr., *Herzog 2238* (L, S, Z); Sta. Rosa, April, fl., *Kuntze s. n.* (NY).

S. natalicia is closely related to *S. glabra* (R. & P.) Soejarto, differing from it in the following characters: leaves without villous-barbate pubescence in the axils of secondary veins beneath, flowers with glabrous sepals, stamens low (20-30) in number. *S. natalicia* also appears to be allied to *S. putumayonis,* but the latter has larger and broader leaves, with sparingly distributed radiate to stellate trichomes on the lower surface, and flowers with pubescent sepals.

22. **Saurauia parviflora** Tr. & Pl., Ann. Sci. Nat. ser. 4, 18: 268. 1862; Prodr. Fl. Nov. Granat. 1: 265. 1862.—Type: *Triana s. n.* (BM).

Saurauia parviflora var. *lehmanniana* Busc., Malpighia 30: 81. 1927.—Type: *Lehmann 9027* (K; GH, NY, photos).

Shrubs to small tree to 5(-10) m. tall, sometimes bushy; glabrescent. Branchlets mostly slender, terete, glabrous to sparingly strigillose pubescent, somewhat smooth, dark brown to black in dry state, shoots and young leaves of same type of pubescence. Leaves clustered behind tip of branchlets; blades narrowly to broadly elliptic to obovate, shortly acuminate at apex with acumen to 10(-25) mm. long, cuneate to obtuse at base, serrulate to rarely serrate along margins, (10-)15-30(-40) cm. long, (5-)8-14 cm. wide, subcoriaceous, dark green above, light green beneath (in dry state dark, deep brown above, light to olive-brown beneath), glossy and smooth above, secondary veins (9-)16-20(-22) pairs, tertiary veins elevated, more prominent than lesser venation, glabrous to occasionally scattered strigose pubescent along midrib above, glabrescent with scattered strigose trichomes along major veins beneath; petioles (1.5-)2-4(-5.5) cm. long, 1.5-2 mm. in diameter, furrowed above, glabrous to glabrescent. Inflorescences straight, (25-)40-100(-200)-flowered, (5-)12-27 cm. long, (2-)4-14 cm. wide, glabrescent, primary peduncle (2-)3.5-7 cm. long, bracts linear, to 5 mm. long, rarely foliaceous, to 20 mm. long. Flowers 12.5-17 mm. broad, buds to 5 mm. in diameter, pedicels 0.5-1.5(-3) mm. long, bracteoles linear, to 5 mm. long; sepals 5, white to greenish white, outer two elliptic to oblong, obtuse, 3-4 mm. long, 2.5-3.5 mm. wide, imbricated one and inner two suborbicular to orbicular-obovate, obtuse, 5-6 mm. long, 4.5-5.5 mm. wide, all glabrous throughout, marginally entire to ciliolate (especially along apex); petals 5, white, broadly oblong to oblong-obovate, usually incised to very rarely tridentate, 6-8 mm. long, 5-6 mm. wide; stamens 40-70, filament 2-2.5 mm. long, anther 1.25-1.75 mm. long; ovary 5-loculed, ellipsoid to globose, smooth to 5-sulculate, glabrous, styles 5, obsolete to 3.5(-4) mm. long, stigmas simple to capitate. Berries green, 5-loculed, globose, to 7 mm. across, 5-sulcate.

Habitat.—Wet mountain forest, mist zone, road cut, and clearing in wet mountain forest, at altitudes of (5-)100-1,500(-2,000) m.

Distribution.—Colombia (Departments of Valle, Cauca, Nariño), mostly restricted along the western side of the Cordillera Occidental.

Vernacular names.—*Moquillo* (Nariño: Checa).

Specimens examined.—COLOMBIA, VALLE: Pacific coast, Rio Yurumangui, El Aguacate, Feb., fl., *Cuatrecasas 16114* (F), fl. fr., *16144* (COL, GH, US; F, fragment). CAUCA: Rio Timbiqui, Nov., fl., *Lehmann 9027* (COL, K; GH, NY, photos). NARIÑO: El Diviso, road to Tumaco, fr., *Calvache 76* (ECON, PASTO); Ricaurte and vicinity, fr., *Checa 17* (ECON, PASTO), Aug., fl., *Soejarto 1444* (ECON, GH, PASTO); Barbacoas, between Junin and Altaquer, May, fl., *Mora 3059* (ECON, PASTO), fl., *Soejarto 1450* (ECON, GH), *1453* (K), veg., *1454* (ECON, GH); Altaquer, Alto de Cayambe, July, fl., *Soejarto & Pinkley 945* (COL, ECON, GH), fl., *947* (COL, ECON, GH, PASTO); Tumaco, La Guayacana, July, fl., *Soejarto & Pinkley 954* (ECON,

GH, PASTO); Buesaco, Santa Maria, July, fl., *Recalde s. n.* (ECON, PASTO); no. loc., fl., *Corella s. n.* (ECON, PASTO). NO PRECISE LOCALITY: Gneshi, fl., *Lehmann BT-805* (K, NY); fl., *Triana s. n.* (BM).

S. parviflora is abundantly represented in western Nariño, in particular in the area between Ricaurte and Tumaco. Field characters include subcoriaceous, glossy, glabrous to glabrescent leaves, with pale green to yellow veins, white to yellowish white inflorescences (peduncle and lateral cymes are of this color) with laxly distributed white flowers. The flowers are often infected by insects (weevils), which burrow their way in before the flowers open. This causes such infected flowers to decay and turn black, making them conspicuous.

The range of *S. parviflora* overlaps with that of *S. peduncularis* in the Ricaurte region, and plants of both species may be found growing in the same place. Natural hybrids may have been produced in such cases, and several collections of this nature have been treated as *S. peduncularis,* due to the stronger influence of this species.

23. **Saurauia pseudoleucocarpa** Busc., Malpighia 29: 342. 1922.—Type: *Lehmann BT-1173* (G, lectotype; A, F-fragment, K, NY, isolectotypes; COL, photo). Illustration: Malpighia 29: *pl. 7, fig. 12.* 1922.

Saurauia micans R. E. Schultes, ined.

Small trees to 10 m. tall; glabrescent. Branchlets slender, terete, ashy to dark brown in dry state, sparingly pubescent with trichomes of tuberculate-strigose to setulose types. Leaves crowded around tip of branchlets; blades elongate-elliptic to elongate-obovate, acuminate at apex with acumen to 20 mm. long, cuneate at base, distantly serrulate with fine and sharp-pointed serrulations along margins, (10-)15-28(-30) cm. long, (3-)5-10(-12) cm. wide, chartaceous, in dry state dark dull brown to sooty above, light to dark reddish brown beneath, glossy above, secondary veins 20-30 pairs, tertiary veins elevated, more prominent than lesser venation, glabrous but occasionally with strigose to strigillose trichomes along major veins above, scattered pubescent with setose to strigose (along midrib) and radiate trichomes (along and between veins) beneath; petioles 2-3(-3.5) cm. long, 1.5-2 mm. in diameter, sparingly strigose to setose pubescent. Inflorescences straight, (20-)50-ca. 150-flowered, (5-) 10-20 cm. long, 3-10 cm. wide, sparingly pubescent with setose to strigose mixed with radiate to clustered trichomes, primary peduncle slender, 1-10 cm. long, bracts linear, to 20 mm. long. Flowers 7-10 mm. broad, buds to 3.5 mm. in diameter, pedicels extremely slender, to 3 mm. long, bracteoles linear, to 3 mm. long; sepals 5, narrowly elliptic to obovate, obtuse, 2.5-3.5 mm. long, 1.5 mm. wide, exposed parts in bud sparingly radiate pubescent, imbricated parts glabrous, all glabrous inside, marginally ciliolate; petals 5, white, spatulate to elongate-obovate, rounded, 4-6 mm. long, 2-2.5 mm. wide; stamens 15-20, filament 2 mm. long, anther 1.5 mm. long; ovary 5-loculed, obovoid, 5-sulculate, glabrous, styles 5, obsolete to 3.5 mm. long, stigmas simple to subcapitate. Berries 5-loculed, obovoid to globose, to 4 mm. across, 5-sulcate.

Habitat.—Rain forest, at altitudes of 0-300 m.

Distribution.—Colombia (Departments of Choco, Valle, Cauca), restricted along the Pacific coastal zone.

Specimens examined.—COLOMBIA, CHOCO: Off San Juan river, Quebrada El Taparal, riverbank, May, fr., *Cuatrecasas 21494* (ECON, F, K, US), Aug., fl., *Hugh-Jones 309* (K); Rio Calima in the Choco region, between Quebrada de Aguaclara and Quebrada La Brea, May, fl., *Lehmann BT-1173* (A, F-fragment, G, K, L, NY; COL, GH, photos). CAUCA: Cordoba, Dagua Valley, Pacific coastal zone, Dec., fl., *Pittier 545* (GH, NY, US).

24. **Saurauia spectabilis** Hort. ex Hook., Bot. Mag. 69: no. 3982. 1842.—Type: Ex icon. Illustration: Bot. Mag. 69: *pl. 3982*. 1842.

Saurauia brevipes Rusby, Descr. 300 New Sp. S. Am. Pl. 57. 1920.—Type: *Bang 387B* (NY, S, UC) (specimen in NY labeled as *Bang s. n.*).

Saurauia aequatoriensis Sprague var. *boliviana* Busc., Malpighia 30: 35. 1927, p. p.

Saurauia rusbyi auct. non Britt.: Busc., l. c. 173. 1927 *(S. rusby)*.

Saurauia rusbyi auct. non Britt. var. *glabrata* Busc., l. c. 175. 1927.—Type: *Bang 387B*.

Saurauia rusbyi auct. non Britt. var. *spectabilis* Busc., l. c. 178. 1927.—Type: *Pentland 116* (P).

Saurauia rusbyi auct. non Britt. var. *spectabilis* fma. *macrophylla* Busc., l. c. 181. 1927.—Type: *Bang 387B*.

Saurauia rusbyi auct. non Britt. var. *spectabilis* fma. *veranii* Busc., l. c. 184. 1927.—Type: *Rusby 481A* (MICH, NY, US).

Shrubs to small trees to 10 m. tall, glabrescent to sparingly pubescent. Branchlets sparingly pubescent, trichomes strigose to sericeous, ferruginous. Leaves crowded around tip of branchlets; blades obovate to elongate-obovate, acuminate at apex with acumen to 15 mm. long, narrowly cuneate to subrotundate at base, often oblique, serrate to serrulate (biserrate, cf. Hooker) along margins, (13-)18-30(-35) cm. long, (4.5-)5-10(-11.5) cm. wide, chartaceous, in dry state dark olive-brown to dark brown above, light olive- to gray-brown beneath, glossy to subglossy above, secondary veins (15-)18-25(-28) pairs, tertiary veins elevated, more prominent than lesser venation, glabrescent to scattered pubescent with trichomes of sericeous-strigillose type along veins above, scattered to sparingly pubescent with trichomes of sericeous-strigose type along veins with pustulate epidermis beneath; petioles 1-3(-3.75) cm. long, 2.5-3.5 mm. in diameter, abundantly pubescent with sericeous-strigose trichomes. Inflorescences straight, many-branched, spreading, (50-)100-300(-500)-flowered, (12.5-)18-35(-42) cm. long, (6-)9-15(-21) cm. wide, abundantly pubescent with sericeous-strigose trichomes, primary peduncle (5-)8-12(-14.5) cm. long, bracts linear to triangular, 2-10 mm. long. Flowers 10-19 mm. broad, buds to 7 mm. in diameter,

pedicels 5-10 mm. long, bracteoles triangular, 2-3 mm. long; sepals 5, ovate to suborbicular, obtuse, 4-7 mm. long, 3-5 mm. wide, exposed parts in bud sparingly strigose pubescent, imbricated parts glabrous, all glabrous inside, marginally ciliate; petals 5, spatulate to obcordate, slightly to deeply incised, 6-8 mm. long, 5-7 mm. wide; stamens (45-)65-85, filament 2-3 mm. long, anther 1-1.65 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, obsolete to 5(-6) mm. long, stigmas simple to capitate. Berries immature.

Habitat.—Mountain forest, garden, and roadside, at altitudes of 750-2,500 m.

Distribution.—Bolivia (Province of La Paz).

Specimens examined.—BOLIVIA, LA PAZ: Unduavi Valley, fl., *Badcock 94* (K), *Julio 467* (US); Larecaja, vic. of Mapiri, Jan., fl., *Bang 1742* (A, F, G, GH, K, MICH, S, US), fl., *Buchtien 1849* (US), Sept., fr., *1992* (US), April, *Rusby 481* (F, G, K, NY, P, US); road Tipuani, hacienda Simaco, Feb., fl., *Buchtien 5461* (BM, F, G, GH, K, NY, P, US, Z); Tipuani Valley, hacienda Casana, Jan., fl., *Buchtien 7377* (P, S, US), fl., *Weddell s. n.* (P, sheet no. 87-29-66); vic. of Onanea, Cerro de Uacani, May, fl., *Mandon 832* (K, P); North Yungas, Coroico, fl., *Pentland 116* (P); Yungas, fl., *Rusby 481A* (MICH, NY, US); basin of Rio Bopi, San Bartolome, near Calisaya, July, fl., *Krukoff 10356* (A, F, G, K, NY, S, U), fl. fr., *Bang 387B* (K, L, NY, S, UC). NO PRECISE LOCALITY: *Pearce s. n.* (K); from cultivation, Kew Garden, fl., *Stove s. n.* (K).

W. J. Hooker (1842) described *S. spectabilis* on the basis of a plant "raised by Mr. Knight, of the Exotic Nursery, King's Road, Chelsea (England), from seeds, imported from the Republic of Bolivia, in 1838." As stressed by Hooker, the species is characterized by the narrow elongate (obovate-lanceolate) leaves and the large, spreading, many-branched and many-flowered inflorescences.

V. Ser. PULVERULENTAE Busc., Malpighia 25: 222. 1912, stat. nov.

Tomentosae Busc., l. c. 220., p. p.
Laevigatae Busc., l. c. 224., p. p.

1. Stamens 20-50, at most not more than 80.
   2. Flowers 20 mm. broad or larger, at least not less than 18 mm. broad, when open.
      3. Sepals subglabrous outside, glabrous on the lower two-thirds to three-fourths and sparingly pulverulent on the upper one-third to one-fourth inside, inflorescences 10-30(-50)-flowered, pedicels 1.5-4 mm. long ... 25. *S. pulchra*
      3. Sepals pulverulent and tuberculate pubescent outside, pulverulent inside,

inflorescences (25-)40-100-flowered, pedicels 0.25-1 mm. long (subsessile). 26. *S. aromatica*

2. Flowers 10 mm. broad, at most not more than 18 mm. broad, when open.
   4. Leaves glabrescent to sparingly pubescent, floccose trichomes predominate.
      5. Blade length to width ratio of (1.2-)2(-2.5) to 1, smooth above, floccose trichomes scattered throughout, epidermis not pustulate beneath, stamens 20-30 ..... 27. *S. floccifera*
      5. Blade length to width ratio of (2-)3(-4) to 1, somewhat scabrous above, floccose and radiate trichomes scattered beneath, epidermis pustulate beneath, stamens (30-)35-50(-80) ..... 28. *S. choriophylla*
   4. Leaves abundantly to sparingly pubescent, tufted and dendroid trichomes predominate.
      6. Blades 20-50 cm. long, 6-25 cm. wide, flowers 10-13 mm. broad; stellate, dendroid, and tufted trichome types predominate .. 29. *S. cuatrecasana*
      6. Blades 15-30 cm. long, 6-12 cm. wide, flowers 15-18 mm. broad; radiate and minute stellate trichome types predominate ..... 30. *S. arnoldi*

1. Stamens 100-ca. 200, but not less than 80.
   7. Leaf pubescence dense and velvety beneath, with trichomes of dendroid and stellate types, lower epidermis obscured by pubescence .. 31. *S. tomentosa*
   7. Leaf pubescence sparser and not velvety beneath, with trichomes of other types but not dendroid nor stellate, lower leaf epidermis not obscured by pubescence.
      8. Flowers 15 mm. broad, pedicels less than 5 mm. long; 1,200-2,000 m. altitudes .....32. *S. pseudostrigillosa*
      8. Flowers 20-25 mm. broad, pedicels 5-12 mm. long; ca. 100 m. altitude. 33. *S. mexiae*

25. **Saurauia pulchra** Sprague, Trans. & Proc. Bot. Soc. Edinburgh 22: 426. 1904.—Type: *Sprague 323* (K, COL, NY, US, photos). Figure 17.

Small trees to 9 m. tall, diameter to 30 cm. at base, bark gray-brown, smooth, trunk crooked; sparingly pubescent. Branchlets moderately thick, terete, pulverulent, and tuberculate pubescent. Leaves crowded around tip of branchlets; blades oblong-obovate, rounded to very shortly and abruptly acuminate at apex, cuneate to obtuse at base, distantly serrate to serrulate along margins, 11-25(-35) cm. long, 5-12.5(-16) cm. wide, firmly coriaceous, in dry state dark brown above, dull brown beneath, glossy and somewhat smooth above, secondary veins 12-24 pairs, tertiary veins irregular, somewhat elevated, scarcely more prominent than lesser venation, scattered tuberculate pubescent along and between veins above, scattered pubescent with trichomes of radiate to stellate or clustered (along veins) mixed with tuberculate-strigose types (along midrib) beneath; petioles 1-1.5 cm. long, 1.5-2 mm. in diameter, furrowed above, glabrescent. Inflorescences often ascending, somewhat straight, 10-30(-50)-flowered, 6-20 cm. long, 3-10 cm. wide, glabrescent to pulverulent along lesser ramification and pedicels, primary peduncle slender, 1-7 cm. long, bracts triangular to linear, to 6 mm. long. Flowers laxly distributed, 20-25 mm. broad, buds to 6 mm. in diameter, pedicels robust, to 3 mm. (4 mm. in fruiting state) long, bracteoles triangular, to 3 mm. long; sepals 5, broadly elliptic to orbicular-ovate, obtuse to rounded, 7-10 mm. long, 5-8

mm. wide, outer two scattered to abundantly minutely stellate pubescent (especially medially), imbricate one and inner two glabrous on exposed parts in bud, sparingly to abundantly minutely stellate pubescent on imbricated parts, all glabrous on lower two-thirds to three-fourths and sparingly to abundantly minutely stellate pubescent on upper one-third to one-fourth inside, marginally irregularly ciliolate; petals 5, white, oblong-obovate to broadly spatulate, rounded, 9-14 mm. long, 7-10 mm. wide; stamens 25-45, filament 3-4.5 mm. long, anther 3-3.5 mm. long; ovary 5(-7)-loculed, subglobose, 5(-7)-sulcate, glabrous, styles 5(-7), 0.8-5 mm. long, stigmas simple to capitate. Berries 5(-7)-loculed, globose, to 10 mm. across, 5(-7)-sulcate.

Habitat.—Wet mountain and submountain forest, moist soil, at altitudes of 1,600-2,300 m.

Distribution.—Colombia (Departments of Cauca and Huila).

Vernacular names.—*Moco* (Huila: Sprague), *Moquillo* (Huila: Schultes & Villarreal).

Specimens examined.—COLOMBIA, CAUCA: Near Cauca-Huila border, Inza, Nov., fl., *Lehmann 2192* (BM, K, US); Tierra Dentro, Rio Paez Valley, Indian Village, Jan., fl., *Pittier 1276* (US). HUILA: Cordillera Oriental, 25 km. NE. of Algeciras, between Vega Temopila and Altagracias, March, fl. fr., *Little, Jr. 7540* (NY, US); west-facing slope of the Cordillera, above Guadalupe, Resina, March, fl., *Perez-Arbelaez & Cuatrecasas 8367* (COL, US); E. of Neiva, Aug., fl. fr., *Rusby & Pennell 598* (NY); "Balsillas" on Rio Balsillas, Aug., fl. fr., *Rusby & Pennell 712* (NY, US; GH, photo); San Agustin and vic., Nov., fl., *Romero-Castañeda 6566* (COL), Jan., fl., *Schultes & Villarreal 5330* (COL, ECON), March, fl., *Sprague 323* (K; COL, NY, US, photos).

26. **Saurauia aromatica** R. E. Schultes, Caldasia 2: 28. 1943.—Type: *Cuatrecasas 9105* (F, US). Illustration: Caldasia 2: *29.* 1943; Bot. Mus. Leafl. Harvard Univ. 20: 223, *pl. 3.* 1963.

Saurauia echinosepala R. E. Schultes, l. c. 34. 1943.—Type: *Perez-Arbelaez & Cuatrecasas 6473* (US, holotype; F, isotype).

Saurauia alvaroi R. E. Schultes, Bot. Mus. Leafl. Harvard Univ. 20:221. 1963.—Type: *Schultes 22551* (ECON, holotype; COL, F).

Small trees to 15 m. tall, diameter to 10 cm. at base, bark gray-brown, lightly fissured; sparingly pubescent. Branchlets robust, terete, sparingly tuberculate to tuberculate-strigose pubescent. Leaves clustered behind tip of branchlets; blades obovate to elongate-obovate, broadly and very shortly acuminate at apex, cuneate to obtuse but rarely oblique at base, frequently with well-developed basal flap, distantly serrulate to serrulate-denticulate along margins, 16-45 cm. long, 8-20 cm. wide, char-

taceous to coriaceous, glossy and smooth and dark green above, light green beneath, secondary veins (15-)20-27(-33) pairs, strongly prominent, tertiary veins elevated, more prominent than lesser venation, glabrescent to tuberculate or tuberculate-strigose pubescent along and between veins above, scattered pubescent with trichomes of stellate to radiate types (along and between veins) mixed with strigose to tuberculate-strigose types (along midrib) beneath; petioles robust, 3-7 mm. in diameter, furrowed above, tuberculate to tuberculate-strigose pubescent and/or lenticellate, often with minute floccose to clustered trichomes. Inflorescences straight, often erect, 25-100-flowered, 15-30 cm. long, 7-15 cm. wide, densely pubescent with trichomes of shaggy- to tufted-tuberculate or -echinulate types and rusty brown in color, primary peduncle stout and woody, 7-15 cm. long, bracts linear, to 7 mm. long, rarely foliaceous, to 20 mm. long. Flowers 17-22 mm. broad, buds to 6 mm. in diameter, pedicels 0.25-1 mm. long (subsessile), bracteoles linear to triangular, to 2 mm. long; sepals 5, orbicular-ovate to oblong or subquadrangular, pale green to white with rusty brown pubescence, obtuse, 5.5-8 mm. long, 4-6 mm. wide, all pulverulent throughout, trichomes sparingly distributed, of shaggy-tuberculate to -echinulate on exposed parts in bud, marginally ciliolate; petals 5, white, oblong-obovate to oblong or subquadrangular, rounded to somewhat truncate, 7-9 mm. long, 3-6 mm. wide; stamens 30-50, filament 2-2.5 mm. long, anther 2.5-3 mm. long; ovary 5-loculed, subglobose, 5-sulcate, glabrous, styles 5, obsolete to 6 mm. long, stigmas simple to capitate. Berries 5-loculed, globose, to 7 mm. across, 5-sulcate.

Habitat.—Wet rain forest, submountain forest, open forest, riverbanks, border of sugarcane plantation, road embankment, cultivation areas, thickets and gardens, at altitudes of 500-2,600 m.

Distribution.—Colombia (Departments of Caldas, Huila, Caqueta, and Putumayo).

Vernacular name.—*Moquillo* (Putumayo: Soejarto).

Specimens examined.—COLOMBIA, CALDAS: Highway of Quindio, between La Gabriela and La Linea, July, fl., *Perez-Arbelaez & Cuatrecasas 6473* (F, US). HUILA: Archeological Park, 3 km. W. of San Agustin, April, fl., *Little, Jr. & Little 7616* (NY, US). CAQUETA: Cordillera Oriental, east facing slope, Quebrada del Rio Hacha, Cajon de Pulido, March, fl., *Cuatrecasas 8722* (US); Sucre, April, fl., *Cuatrecasas 9105* (F, US); between Sucre and La Portada, April, fl., *Cuatrecasas 9150* (F, US). PUTUMAYO: Quebrada del Rio Mulato, Dec., fl., *Cuatrecasas 11282* (F, US); road from San Francisco to Mocoa, 10 km. above Pepino, July, fl., *Schultes 22551* (ECON, F, GH); Pepino of Mocoa and vic., Aug., fl. fr., *Soejarto 523, 524, 528, 534, 544* (all in ECON, GH); Road Sibundoy to Pepino of Mocoa, La Mesa and vic., Aug., fl. fr., *Soejarto 1575-1578, 1582, 1583, 1586* (all in ECON, GH), veg., *1579, 1580* (both in ECON), veg., *1584, 1585, 1587, 1588, 1590* (all in ECON, GH).

When Schultes (1963, p. 222) described *S. alvaroi,* he noted that

"the species may be distinguished from all other known concepts of the genus by a most curious canal-like pouch which is formed by two conspicuous vexilliform flaps arising perpendicularly from the base of the leaf blade along the midrib and which are joined together at their apical and basal ends." Field studies, however, could not confirm the taxonomic importance of this basal flap, since it occurs rather widely, though not frequently, in many other unrelated species. Among others, such a flap was recorded in *S. tomentosa, S. brachybotrys, S. cuatrecasana, S. caquetensis,* and *S. pseudostrigillosa.* Furthermore, members of the population of *S. aromatica* from the same locality as that of the type collection, in the Mocoa region, possess both flap- and non-flap-bearing leaves. Also, flap- and non-flap-bearing leaves may even be found in the same tree. A series of herbarium collections of *S. aromatica* and *S. brachybotrys,* from the Nariño and Putumayo regions, establish that the basal flap is actually formed by the continuation of the leaf margins, probably a product of abnormal development. This structure is so well developed in certain individuals that it is boat-like in shape.

27. **Saurauia floccifera** Tr. & Pl., Ann. Sci. Nat. ser. 4, 18: 267. 1862; Prodr. Fl. Nov. Granat. 1: 264. 1862.—Type: *Triana s. n.* (G, lectotype; F-fragment, K, P, US, isolectotypes; GH, photo). Figure 18.

Small trees to 10 m. tall, crown spreading; copiously pubescent. Branchlets stout, terete, dark grayish brown to sooty in dry state, sparingly pubescent; trichomes tufted and dendroid to dendroid-tufted. Leaves crowded behind tip of branchlets; blades broadly elliptic to obovate, acute to acuminate to cuspidate at apex with acumen to 10 mm. long, narrowly to broadly cuneate at base, rarely oblique, serrulate to distantly serrate with fine serrations along margins, (8-)10-25(-30) cm. long, (6-)8-16 cm. wide, chartaceous to rarely membranaceous, in dry state dark reddish brown to sooty above, dull gray-brown beneath, smooth and glossy above, secondary veins (18-)23-30(-33) pairs, tertiary veins elevated, more prominent than lesser venation, scattered floccose pubescent above, scattered pubescent with trichomes of floccose (along veins) mixed with tufted to dendroid-tufted types (along midrib) beneath; petioles 1.5-3 cm. long, 2-3 mm. in diameter, scattered to sparingly floccose pubescent. Inflorescences straight, (25-)30-100(-ca. 150)-flowered, 9-24 cm. long, 3.5-8.5 cm. wide, lower parts sparingly floccose pubescent, upper parts and lesser ramification pulverulent, trichomes of clustered and dendroid to tufted types, primary peduncle 3-12 cm. long (16 cm. long, cf. Schultes), bracts linear to triangular, to 8 mm. long. Flowers 10-15 mm. broad, buds to 3-5 mm. in diameter, pedicels to 4 mm. long, bracteoles triangular, usually upwards curved, to 2 mm. long; sepals 5, white to pale green, elliptic to obovate, obtuse, 4-5 mm. long, 2.5-3.5 mm. wide, all pulverulent throughout, and densely pubescent with trichomes of stellate, clustered, tufted, and dendroid types on exposed parts in bud, but of stellate type on imbricated parts, marginally ciliolate, especially on apex; petals 5, white, obovate to oblong, rounded, 4.5-6 mm. long, 3.5-5 mm. wide; stamens 20-30, filament 2.5 mm. long, anther 2 mm. long; ovary 5-loculed,

ovoid to subglobose, 5-sulculcate, glabrous, styles obsolete to 3.5 mm. long, stigmas simple to subcapitate. Berries 5-loculed, obovoid to subglobose, to 6 mm. across, 5-sulcate.

Habitat.—Rain forest, steep wooded slope, rich soil, sugarcane field, secondary forest, wet forested slopes, and mist-covered zone, at altitudes of 600-2,000 m.

Distribution.—Venezuela (State of Tachira) and Colombia (Departments of Choco, Antioquia, Norte de Santander, Cundinamarca and Meta).

Vernacular names.—*Dulumoco* (Choco: Archer), Chupahuevo (Cundinamarca: Triana).

Specimens examined.—VENEZUELA, TACHIRA: Alto de Lirio, between Bramon and Las Delicias, July, fl. fr., *Steyermark 57460* (F, NY). NO PRECISE LOCALITY: Alicia del Rio Aponcito, Tulia, Jan., fl., *Vareschi 3113* (VEN).

COLOMBIA, NORTE DE SANTANDER: Sarare region, basin of Margua River, between Junin and Cordoba, Nov., fl., *Cuatrecasas 13367* (US). CHOCO: Between La Oveja and Quibdo, April, fl., *Archer 1733* (US). CUNDINAMARCA: Ubala, Aug., fl., *Triana 5414* (BM, COL, US); Caqueza, canyon of Rio Negro, halfway between Guayabetal and Serovita, Aug., fl., *Fosberg & Bellis 22066* (NY, US); road Guayabetal to Quetame, Monteredondo, June, fl., *Uribe-Uribe 4842, 4843* (both in COL, ECON); Guayabetal, Aug., fl., *Richter s. n.* (GH, US); SE. of Quetame, Susumuco, Sept., fr., *Pennell 1741* (NY); Quetame, Aug., fl., *Schultes 5684* (COL, F, GH, K, NY, US), *Triana s. n.* (G, K, P; F, fragment; GH, US, photos). META: Horse trail between Guayabetal and Acacias, Rio Manzanares, Aug., fl., *Garcia-Barriga 15397* (COL, ECON); vic. of Villavicencio, Jan., fl., *Haught 2554* (A, COL, S, US).

Like *S. tomentosa*, members of *S. floccifera* are characteristically beset with multi-cellular branched trichomes, which are, in the case of the latter, early caducous (floccose), particularly along the branchlets, the petioles, the primary peduncle and the leaf surfaces, thus leaving these organs glabrescent to sparingly pubescent when mature. However, *S. floccifera* differs greatly from *S. tomentosa* in floral characters, especially in flower size and stamen number. Also, other aspects of pubescence in these two species are different.

As to the ecology of the species, the following remarks by Schultes (1945, p. 252) on the species population in the Quetame area are

noteworthy: "A careful examination of *Saurauia floccifera* in the gorge through which the highway runs indicates that the leaves are rather generally smaller than those of the type. It is my belief that the type may have been collected from a forest where the plant grew in a shaded situation. At the present time, the hills along this gorge are partly, or, in many places, completely deforested, and the individuals of *Saurauia floccifera* are usually found in isolated areas on grassy slopes. Near the lower range of the species, there are a number of individuals which occur in the forest, and it was noted that the leaves of these tend to be larger and thinner (cf. *O. Haught 2554*). Similarly, the collection of *L. Richter s. n.,* from a relatively low altitude in the same general region, has larger, more membranaceous leaves." Further, from the field notes of collectors, it appears that *S. floccifera* may be easily noted in the field by its showy white inflorescence.

28. **Saurauia choriophyla** R. E. Schultes & Gutierrez, Caldasia 3: 251. 1945.—Type: *Toro 845* (MEDEL, holotype; NY, isotype).

Trees to 20 m. tall, diameter to 40 cm. at base, bole somewhat straight, bark fissured, brown, crown spreading to somewhat conoidal; glabrescent. Branchlets terete, distinctly scarred, pulverulent, abundantly to densely pubescent with trichomes of tuberculate to shaggy-strigillose types, rusty brown in color. Leaves crowded behind tip of branchlets; blades oblong-obovate to elongate-obovate but rarely oblong to elongate elliptic, acute to shortly acuminate at apex, with acumen to 10 mm. long, cuneate to rarely oblique at base, subentire to serrulate with very fine serrulations along margins, 15-25(-30) cm. long, 4.5-10(-12) cm. wide, subcoriaceous to chartaceous, somewhat scabrous throughout, in dry state sooty above, dark to light dull brown beneath, secondary veins 23-30 pairs, tertiary veins elevated, more prominent than lesser venation, glabrescent with pustulate epidermis above, sparingly pubescent with floccose and radiate trichomes, and with pustulate epidermis beneath; petioles 2-5 cm. long, 1-2 mm. in diameter, half-terete, pulverulent. Inflorescences straight, 20-100-flowered, 5-20 cm. long, 3-8 cm. wide, lower parts glabrescent, upper parts and along lesser ramification densely pubescent, trichomes of shaggy-strigillose type, yellowish to rusty-brown in color, primary peduncle 3-8 cm. long, bracts linear, to 5 mm. long. Flowers 10-15 mm. broad, buds to 5 mm. in diameter, pedicels to 3 mm. long, bracteoles triangular to linear, to 1.5 mm. long; sepals (4-)5, suborbicular to oblong or ovate, rarely spatulate, acute to rounded, 4-5 mm. long, 2.5-5 mm. wide, exposed parts in bud abundantly to densely pubescent with trichomes of radiate to shaggy or shaggy-tuberculate types, imbricated parts densely stellate pubescent, all densely stellate pubescent inside, marginally ciliolate; petals (4-)5, white, oblong-obovate, 5-7 mm. long, 4.5-5 mm. wide; stamens (30-)35-50(-80), filament 2.5-3 mm. long, anther 1.5-2 mm. long; ovary (4-)5-loculed, globose, (4-)5-sulcate, glabrous, styles (4-)5, obsolete to 4.5 mm. long, stigmas simple to capitate. Berries unknown.

Habitat.—Secondary forest, fringe of forest, wet forested riverbank, humid coffee plantation and waysides, at altitudes of 1,000-1,800 m.

Distribution.—Colombia (Departments of Antioquia, Caldas, Tolima, and Valle).

Vernacular name.—*Dulumoco* (Valle: Herrera).

Specimens examined.—COLOMBIA, ANTIOQUIA: Pueblorico, June, fl., *Espinal 79* (MEDEL); Venecia, June, fl., *Soejarto & Rivera 2054* (ECON, GH, MEDEL); Fredonia, June, fl., *Soejarto & Rivera 2055* (ECON, GH, MEDEL), Dec., fl., *Toro 845* (MEDEL, NY). CALDAS: Chinchina, *Cuatrecasas 23375* (F, GH); NE. of Armenia, July, fl., *Pennell et al. 8666* (GH, NY, US). TOLIMA: El Fresno, Alto de Aguila, Dec., fl., *Garcia-Barriga* 8227 (COL, US); El Libano, La Trinidad, Dec., fl., *Pennell 3306* (NY, US). VALLE: Cordillera Occidental, basin of Rio Calima, between Darien and Mediacanoa, El Cairo, Jan., fl., *Cuatrecasas 13892* (F, GH); Sevilla, June, fl., *Herrera 922* (US).

S. choriophylla is closely allied to *S. floccifera,* but the former has more elongate, pustulate, and somewhat scabrous leaves (particularly the lower surface), with a higher stamen number (35 or more, but less than 80), in contrast to the broad, smooth, and somewhat glossy (above), and non-pustulate leaves, with a lower stamen number (20-30), in the latter.

29. **Saurauia cuatrecasana** R. E. Schultes, Caldasia 2: 315. 1944.—Type: *Cuatrecasas 9209* (COL, holotype; F, US, isotypes). Figure 19.

Trees to 10(-30) m. tall, diameter to 20(-40) cm. at base, bark thick, brittle, irregularly cracked, light gray-brown, living bark ochre in color, wood soft, with ochre-rosy tint, crown spreading; copiously pubescent. Branchlets stout, robust, terete, distinctly scarred, mealy white to yellowish, densely scurfy pubescent with tuberculate trichomes, scabrous. Leaves clustered behind tip of branchlets; blades broadly obovate to elliptic to oblong, acute to obtuse but rarely very shortly acuminate at apex, cuneate to obtuse at base, often oblique, rudimentary basal flap occasionally present, serrulate with very fine serrulations along margins, 20-40(-50) cm. long, (6-)10-20(-25) cm. wide, chartaceous, scabrous above and beneath, in dry state dark brown to sooty above, light reddish to olive-brown beneath, secondary veins 23-30(-33) pairs, tertiary veins elevated, more prominent than lesser venation, scattered to sparingly pubescent with trichomes of tuberculate (along and between major veins) to strigillose types (along midrib) above, densely pubescent with trichomes of stellate to shaggy or dendroid or dendroid-tufted types and deep reddish violet in color beneath (scurfy in appearance along major veins); petioles robust, 3-10(-13) cm. long, 2-5 mm. in diameter, somewhat furrowed above, densely to abundantly scurfy pubescent with tuberculate trichomes. Inflorescences straight and often spreading, (50-)100-(more than)300-flowered, 15-30(-35) cm. long, (3-)7-15 cm. wide, densely pubescent with trichomes of shaggy to tufted types, mealy and yellowish to rusty brown in color, primary peduncle 4-16 cm. long, bracts linear to linear-triangular, to 8 mm. long. Flowers 10-13 mm. broad, buds

to 4 mm. in diameter, often obovoid, pedicels to 2(-3) mm. long, bracteoles minute, linear-triangular, to 1-5 mm. long; sepals 5(-6), pale yellowish green to white, oblong to oblong-elliptic to suborbicular, subacute to rounded, 3-4.5 mm. long, 2-3.5 mm. wide, all densely scurfy pubescent with trichomes of shaggy-tuberculate type on exposed parts in bud and of radiate to stellate types on imbricated parts, and densely stellate pubescent (sometimes limited to lower one-fourth only) inside, marginally ciliolate; petals 5, white, oblong to oblong-obovate, rounded and rarely somewhat incised, 5-6 mm. long, 2.5-3.5 mm. wide; stamens 25-40, filament 2.5-3 mm. long, anther 1.5 mm. long; ovary 5(-6)-loculed, globose, 5(-6)-sulculate, glabrous, styles 5(-6), obsolete to 4 mm. long, stigmas simple to capitate. Berries unknown.

Habitat.—Forest, fringe of forest, open hillsides, submountain forest, at altitudes of 1,900-2,900 m.

Distribution.—Colombia (Departments of Caldas, Tolima, Valle, Cauca, and Huila).

Specimens examined.—COLOMBIA, CALDAS: Vic. of Manizales, Gallinazo, May, fl., *Cuatrecasas 9209* (COL, F, US); Cordillera Central, Otun River basin, between Peña Bonita and Las Delicias, Nov., fl., *Cuatrecasas 23352* (ECON, F, GH); Miraflores, on road Manizales to Nevado del Ruiz, June, fl., *Soejarto 2030* (ECON, GH), July, fr., *Pinto 423* (COL). TOLIMA: Along Quindio highway, between Cajamarca and summit of Divide, March, fl., *Killip & Varela 34547* (BM, US). CAUCA: Cordillera Central, headwaters of Rio Palo, Quebrada de Santo Domingo, Dec., fl., *Cuatrecasas 19172*; Rio Munchique, July, fl., *Garcia-Barriga et al. 12951* (US); Alto de Punicias, near Jambolo, Rio Palo basin, Tierra Dentro, Feb., fl., *Pittier 1457* (US). HUILA: Road to La Plata, region of Moscopan, Santa Leticia, July, fl., *Garcia-Barriga & Hawkes 12871* (US).

30. **Saurauia arnoldi** Sleumer, Notizbl. 12: 143. 1934.—Type: *Schultze 814* (not seen), ex descr.; *Kernan 125* (NY, neotype; P, US, iso-neotypes). Figure 20.

Small trees to 6 m. tall; sparingly pubescent. Branchlets slender, angular to terete, glabrescent to sparingly strigose pubescent. Leaves crowded behind tip of branchlets; blades obovate to oblong- or elliptic-obovate, rotundate to cuspidate to broadly acuminate at apex with acumen to 20 cm. long, serrate-dentate along margins with serrations terminating into setae, 15-20(-30) cm. long, 6-12 cm. wide, chartaceous, somewhat scabrous above, secondary veins 16-22 pairs, tertiary veins elevated, more prominent than lesser venation, scattered strigillose pubescent along minor veins (pubescence denser along major veins) above, scattered to sparingly pubescent with trichomes of radiate to stellate (along and between veins) mixed with strigose to strigillose types (along major veins) beneath; petioles (1-)1.5-4(-6) cm. long, 1.5-3 mm. in diameter, half-terete, sparingly to abundantly strigose pubescent. Inflorescences somewhat straight, moderately-branched, 35-100-flowered, 7-20 cm. long, 4-8 cm. wide, abundantly scurfy pubescent with trichomes of stellate to radiate (especially

along lesser ramification) mixed with strigose to shaggy-strigose types, primary peduncle 6-12 cm. long, bracts linear, to 6 mm. long. Flowers 15-18 mm. broad, buds to 5 mm. in diameter, pedicels to 5 mm. long, bracteoles triangular to linear, to 3 mm. long; sepals 5, often white, elliptic to oblong or oblong-obovate, acute to rounded, 5-7 mm. long, 3-4 mm. wide, all densely to abundantly stellate pubescent throughout, but occasionally shaggy-strigose trichomes are found on exposed parts in bud, and lower portion inside glabrous medially, marginally to submarginally ciliolate; petals 5, white, oblong to oblong-elliptic, obtuse to rounded, 7-8(-9) mm. long, 2-5 mm. wide; stamens 25-40, filament 2-3 mm. long, anther 2.5 mm. long; ovary 5-loculed, ovoid, 5-sulcate, glabrous, styles 1-7 mm. long, stigmas simple to capitate. Berries immature.

Habitat.—Damp forest, thicket near stream, old clearing, ravines and riverbanks, at altitudes of 1,300-2,000 m.

Distribution.—Colombia (Department of Magdalena).

Specimens examined.—COLOMBIA, MAGDALENA: Between San Pedro and the headwaters of Rio Sevilla, La Cebolleta, Jan., fr., *Barclay & Juajibioy 6797* (ECON); Colonia Hurtado, San Lorenzo Mts., NW. exposure, June, fl., *Kernan 125* (NY, P, US); Santa Marta, Sierra del Libano, March, veg., *Smith s. n.* (NY); Las Nubes, Dec., fl., *Smith 809* (A, BM, F, G, GH, K, L, MA, MICH, NY, P, S, U, UC, US); Rio Domachui Basin, Cancurua, Oct., fr., *Cuatrecasas & Romero-Castañeda 24804* (US); no. loc., *Linden 789* (BM).

The distribution of *S. arnoldi* is restricted to the Sierra Nevada of Santa Marta, where the type, *Arnold Schultze 814,* was collected in the San Lorenzo area, at an altitude of 2,200 m., on March, 1927. Since the original type specimens have possibly been destroyed (Sleumer, in litt.), *Kernan 125* has been selected as a neotype because of the excellent match with the original specific description. In addition, *Kernan 125* also represents a topotype.

With regard to field characters, the following note of Harriet Barclay *(Barclay & Juajibioy 6797)* is noteworthy: "Herb to 4-5 m. tall; stem red, with brown hairs above. Leaves darker green above, red veins, rough. Flowers white in bud, sepals white, petals white, filaments yellow-green, anthers yellow, pistil green. Flowers resemble *Begonia.*" This is, strangely, quite a contrast to the following note by Arnold Schultze: "Peculiar gnarled tree of scandent habit. Inflorescences and flower buds pink, petals white inside, light pink outside."

31. **Saurauia tomentosa** (HBK.) Spreng., Syst. Veg. ed. 16. 4. Cur. Post. 2: 211. 1827. Based upon *Palava tomentosa* HBK. Illustration: HBK., Nov. Gen. Sp. Pl. 7: *pl. 650*. 1824; Rhodora 65: 14. *fig. 8*. 1963. Figure 22.

Palava tomentosa HBK. in Kunth, Synops. Pl. Aequinoct. 3: 213. 1922; Nov. Gen. Sp. Pl. 7: 222. *pl. 650.* 1824.—Type: *Bonpland 3206* (P, lectotype; F, isolectotype; NY, US, photos).

Saurauia ruiziana Steud. var. *tomentosa* (HBK.) Choisy, Mém. Soc. Phys. Genève 14: 116. 1855. (Based upon *P. tomentosa*).

Saurauia pseudoexcelsa Busc., Malpighia 25: 235. 1912, p. p. (type excl.).

Saurauia sprucei Sprague, Trans. & Proc. Bot. Soc. Edinburgh 22: 427. 1904.—Type: *Spruce 6195* (BM, G, K, P).

Saurauia tomentosa (HBK.) Spreng. var. *chillanea* Busc., Malpighia 27: 4. 1914.—Type: *Sodiro 153* (not seen), ex descr.

Saurauia pruinosa R. E. Schultes, Bot. Mus. Leafl. 16: 81. 1953.—Type: *Schultes & Villarreal 7651* (ECON, holotype: COL, NY, US, isotypes).

Trees to 30 m. tall, diameter to 40 cm. at base, trunk to 15 m. long, straight, bark deeply fissured, corky, brown to ashy-brown, wood light brown, coarsely fibrous, crown open; copiously pubescent. Branchlets stout, terete, strongly scarred, ashy to hoary tomentose pubescent and mealy in appearance, with trichomes of tufted to dendroid types (aloeform, cf. Schultes), brown to whitish brown. Leaves crowded behind tip of branchlets; blades obovate to elliptic, acuminate at apex with acumen to 15 mm. long, cuneate to rotundate, sometimes pseudoauriculate at base, often oblique, basal flap infrequently present, finely denticulate to serrulate-denticulate along margins, (12.5-)20-35(-45) cm. long, (4-)7-12(-15) cm. wide, strongly coriaceous, dark brown to green above, gray to ashy-brown or brown beneath, rarely deep red-brown, scabrous above, secondary veins (25-)28-37(-42) pairs, tertiary veins elevated, more prominent than lesser venation, pubescent with trichomes of tuberculate to tuberculate-strigose (between veins) and strongly strigose to shaggy-strigose types (along veins) above, densely hoary- to velvety-brown tomentose pubescent with trichomes of dendroid to tufted or dendroid-tufted mixed with stellate (between veins) and strongly tufted to dendroid-tufted to shaggy-strigose types (along veins) beneath; petioles (1.25-)2-4.5(-6) cm. long, 2.5-5.5 mm. in diameter, pubescence similar to that along branchlets. Inflorescences straight, 25-70(-120)-flowered, 14-26 cm. long, 5-12(-15) cm. wide, pubescence similar to that along branchlets, primary peduncle (3-)5-13 cm. long, bracts subulate, 4-10 mm. long. Flowers (18-)20-25(-30) mm. broad, buds to 10 mm. in diameter, pedicels to 15 mm. long, bracteoles triangular, 2-4 mm. long; sepals 5, 9-13 mm. long, 6-9 mm. wide, outer two ovate to elliptic, acute to obtuse, imbricate one ovate to elliptic, obtuse, inner two oblong to suborbicular, obtuse to rounded, all densely stellate pubescent throughout, but exposed parts in bud also with tufted trichomes, marginally and apically ciliolate to ciliate; petals 5, white to creamy white, oblong to suborbicular, obtuse, often deeply incised, 10-13 mm. long, 8-10 mm. wide; stamens (87-)100-186(-200), filament 3-4 mm. long, anther 1.5-2 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, 3-6 mm. in diameter, styles 5, fleshy, obsolete to 6.5(-7.5) mm. long, stigmas simple to capitate. Berries green, often with purple or maroon tint, globose to ovoid, to 15 mm. across, 5-loculed, 5-sulcate.

Habitat.—Wet mountain forest, submountain forest, cloud-covered

zone, secondary forest, edge of primary forest, open and wind-swept hillside, steep slope, along shady wet places and streams, sugarcane plantation, gardens, abandoned fields, roadside embankment and meadows, at altitudes of 2,000-2,800 (-3,000) m.

Distribution.—Venezuela (States of Falcon, Trujillo, Merida, Tachira), Colombia (Departments of Norte de Santander, Cundinamarca, Nariño, Putumayo), Ecuador (Provinces of Pichincha, Tungurahua, Bolivar, Chimborazo).

Vernacular names.—*Babosa* (Tachira: Steyermark), *Cujaro* (Merida: Hahn), *Moquillo* (Nariño-Putumayo: Soejarto), *Carron* (Bolivar: Rimbach, Solis), *Tation* (Bolivar: Solis).

Specimens examined.—VENEZUELA, FALCON: Zumuro coast, road between Toronday and Mucuchies, May, fl. fr., *Badillo 853* (VEN). TRUJILLO: Above Jojo, towards La Morita, Aug., fl., *Aristeguieta & Medina 3412* (NY, VEN); vic. of Visun (Las Mesitas), Aug., fl., *Aristeguieta & Medina 3676* (NY, VEN); La Lagunita, Sept., fl., *Jahn 1146* (US, VEN). MERIDA: 35 km. W. of Merida, along road to La Carbonera, Feb., fl., *Breteler 3606* (VEN). TACHIRA: Between Villapaez and Betania, along Rio Tachira, near Colombo-Venezuelan boundary, July, fl. fr., *Steyermark 5761* (F, VEN).

COLOMBIA. NORTE DE SANTANDER: Culaga Valley, near Tapata (N. of Toledo), March, fl. fr., *Killip & Smith 20347* (A, COL, GH, NY, US); Cordillera Oriental, basin of Samaria River, Oct., fr., *Cuatrecasas & Schultes 12802* (GH). CUNDINAMARCA: Vic. of Salto de Tequendama, in the Sabana of Bogota, fl., *Humboldt 5761* (COL, G, NY, photos). NARIÑO: Municip. of Piedrancha, along Rio Guabo, upper reaches of Rio Guiza, July, fl., *Soejarto & Pinkley 973* (COL, ECON, GH), *1437, 1438, 1467, 1468* (all in ECON, GH), fl. fr., *1469* (ECON, GH, PASTO), *1470* (ECON, GH), fl., *1471* (ECON, GH). PASTO: Cantaclaro, near roadside Pasto to la Florida, July, fl., *Soejarto 1042*, fl. fr., *1043* (both in COL, ECON, GH, PASTO); above Pasto, road to Buesaco, July, veg., *Soejarto & Vogelmann 1201* (COL, ECON, GH, PASTO, US); road Pasto to Chachagui, July, veg., *Soejarto & Hernandez 1207* (COL, ECON, GH, PASTO); above Instituto Tecnologico Agricola Experimental Station, Aug., fl., *Soejarto 1476*, veg., *1477* (both in COL, ECON, GH), veg, *1481, 1482* (both in ECON, GH); Corota Island on Lake La Cocha, fl., *Soejarto 2009* (ECON, GH); vic. of El Encano, April, fr., *Hernandez 10* (ECON, PASTO), fl., *80, 81* (both in GH, PASTO, US), fl., *Soejarto & Porter 503, 504* (both in COL, ECON, GH), fl., *508*, veg., *508A, 509* (all in

ECON, GH); below Paramo de Tabano, July, fl., *Soejarto 1047* (COL, ECON, GH), fl., *1053* (COL, GH, PASTO), veg., *1055* (ECON, GH), fl., *1432A, 1433* (both in COL, ECON, GH); above Lake La Cocha, on road to Sibundoy, near Paramo de Bordoncillo, May, fr., *Schultes & Villarreal 7564* (COL). PUTUMAYO: Two to 5 km. N. of San Pedro de Sibundoy, Aug., fl., *Chindoy 180* (ECON); Sibundoy Valley, May, fl., *Schultes & Villarreal 7651* (ECON, K, NY, US).

ECUADOR, PICHINCHA: Quito, *Bonpland 3206* (F, P; NY, US, photos). TUNGURAHUA: NW slope, April, fr., *Bell 736* (BM); Baños, April, fl., *Benoist 4178* (P). BOLIVAR: Cerro de Pucarra, trail to Telimbela, Nov., fl., *Solis 6832* (F); vic. of Chillanes, Nov., veg., *Solis 6668* (F); between Capillaucu and Los Illanes, Oct., fl., *Solis 6314* (F); Cordillera Occidental, Valle de Limon, Oct., fl., *Solis 6398* (F); Balsapamba and vic., Oct., *Rimbach 232* (F, G, NY), fl., 373 (S). CHIMBORAZO: Chimborazo, fl., *Spruce 6195* (BM, G, K, P; US, photo). GUAYAS: Guayaquil, fl., *Ruiz & Pavon s. n.* (F, fragment; G). NO EXACT LOCALITY: In Andibus Ecuadorensibus, fl., *Spruce 5174* (BM, F-fragment, G, K, NY, P); Palmira, Feb., fl., *Benoist 3822* (P); San Jose de Minas, March, fl., *Benoist 3958* (P).

S. tomentosa is one of the most beautiful of the South American species and is worthy of cultivation. It is commonly found in disturbed habitats as low, many-branched trees, 3-5 m. tall, but with a trunk of up to 30 cm. in diameter, as a result of pruning. The low and profusely branched tree with a pink pruinose indument on the leaves and large white flowers is a most pleasing sight.

The original habitat of the species is wet mountain forest with rich humus, at altitudes of 2,400-3,000 m., such as that found on the Corota Island (2,800 m. alt.) in the middle of Lake La Cocha. The vegetation on this island still remains intact because of government protection. Here, individuals of *S. tomentosa* are rather abundant, and the trees grow to a height of 15-20 m., with a bole straight and a diameter of up to 40 cm. at base. The only other species growing on this island is *S. bullosa.*

Individuals collected from lower altitudes (800-1,800 m.) are usually influenced by other species found in that locality, and can be distinguished by the presence of trichome types not found in *S. tomentosa,* the less dense indument, and the smaller size of the flowers. This is the case with many of the specimens collected from Merida, Norte de Santander, Piedrancha (Nariño), and Bolivar. However, the presence of dendroid to dendroid-tufted trichome types,

combined with the high number of stamens (100-200) identify them as members of *S. tomentosa*.

32. **Saurauia pseudostrigillosa** Busc., Malpighia 28: 125. 1917.—Type: *Sodiro 152* (COL, GH, NY, photos). Illustration: Malpighia 28: *pl. 6, fig. 11. 1917.*

Saurauia floribunda Benth. ex Sprague, Trans. & Proc. Bot. Soc. Edinburgh 22: 426. 1904, p. p. (type incl.)—Type: *Spruce 5540* (F, fragment; BM, G, GH, K, NY, P, US)

Erect shrubs to small trees; sparingly pubescent. Branchlets stout, irregularly angular, distinctly scarred, abundantly scurfy-pubescent, trichomes of tuberculate to tuberculate-strigose types. Leaves crowded behind tip of branchlets; blades obovate to elongate-obovate, rotundate to obtuse but rarely cuspidate at apex, cuneate to rarely obtuse at base, sometimes with rudimentary basal flap, serrulate along margins, (15-)20-35(-37) cm. long, (6-)8-15(-16) cm. wide, chartaceous, somewhat scabrous above, secondary veins (16-)20-35 pairs, tertiary veins elevated, more prominent than lesser venation, muricated to tuberculate pubescent along and between veins above, scattered to sparingly pubescent with trichomes of radiate to stellate to clustered (between veins) and tuberculate-strigose types (along veins) beneath; petioles (1.5-)2-3.5(-4.5) cm. long, 2-4 mm. in diameter, slightly furrowed above, glabrescent to sparingly pubescent along furrow. Inflorescences straight, many-branched, (20-)40-80 (-100)-flowered, (10-)15-30 cm. long, 5-15 cm. wide, densely to abundantly scurfy-pubescent with trichomes of strigose to tuberculate-strigose mixed with clustered types, primary peduncle 6-14 cm. long, bracts triangular, to 4 mm. long. Flowers ca. 15 mm. broad, buds to 5 mm. in diameter, pedicels to 5 mm. long, bracteoles triangular, to 2 mm. long; sepals 5, outer two ovate, 6-8 mm. long, 5-6 mm. wide, acute, imbricate one suborbicular, 8-10 mm. long, 6-8 mm. wide, inner two suborbicular-oblong, 8-10 mm. long, 7-8 mm. wide, exposed parts in bud densely scurfy-pubescent with trichomes of tuberculate type, imbricate parts densely stellate pubescent, all densely stellate pubescent inside, marginally and apically ciliolate; petals 5, oblong, obtuse to rounded, ca. 10 mm. long (open flowers not seen); stamens 100-200, filament 2.5-3 mm. long, anther ca. 1.5 mm. long; ovary 5(-6)-loculed, globose, 5(-6)-sulcate, glabrous, styles 5(-6), obsolete to 5.5 mm. long, stigmas simple to capitate. Berries 5(-6)-loculed, subglobose, to 6 mm. in diameter, 5(-6)-sulcate.

Habitat.—Andean forest, at altitudes of 1,200-2,000 m.

Distribution.—Ecuador (Province of Pichincha).

Specimens examined.—ECUADOR, PICHINCHA: Guajalito, Saloya, western descent of the Cordillera, fl., *Solis 5676* (F), fr., *5677* (F); Saloya, "km. 50 to 70 of the road," Aug., fl., *Solis 1096* (F). NO PRECISE LOCALITY: Western Andes, Las Maquinas, Sept., fr., *Anthony & Tate 269* (US); in Andibus Ecuadorensibus, Pallatanga, fl., *Spruce 5540* (F, fragment; BM, G, GH, K, NY, P; US, photo); near Canzacoto and Morascocha, fl., *Sodiro s. n.* (P); no locality, fl., *Sodiro 152* (COL, GH, NY, photos), July, fl., *Benoist 4480* (P).

Anthony & Tate 269 and *Solis 5677,* both of which are in fruiting condition, match very well the specific original description and the type photograph. On the other hand, *Spruce 5540,* the type of *S. floribunda* Benth. ex Sprague (a homonym of *S. floribunda* Lind. & Pl.; see *S. excelsa*), has too high a number of flowers per inflorescence (over 100) and too low a number of stamens per flower (34-50), but other characters fall within the range of *S. pseudostrigillosa.*

33. **Saurauia mexiae** Killip ex Soejarto, Bot. Mus. Leafl. 22: 268. 1969.—Type: *Mexia 8488* (US; holotype; F, K, NY, S, U, UC, isotypes). Figure 21.

Trees to 10 m. tall; copiously pubescent. Branchlets somewhat terete, distinctly scarred, abundantly to sparingly strigose pubescent, pubescence mealy. Leaves crowded around tip of branchlets; blades somewhat broadly obovate, abruptly acuminate with acumen to 15 mm. long, obtuse to rounded at base, rarely oblique, serrulate along margins, 17-28 cm. long, 9-15 cm. wide, chartaceous, in dry state dark olive-brown above, gray-green beneath, somewhat scabrous above, secondary veins 16-22 pairs, tertiary veins elevated, more prominent than lesser venation, shaggy-strigillose pubescent along veins above, abundantly pubescent with trichomes of stellate (along and between veins) mixed with strigillose types (along major veins) beneath, epidermis somewhat pustulate throughout; petioles 1.5-3 cm. long, 2-3 mm. in diameter, half-terete, densely strigillose to strigose pubescent. Inflorescences straight, lax, and somewhat spreading, ca. 100-flowered, 18-26 cm. long, 10-17 cm. wide, abundantly to densely pubescent with trichomes of shaggy to shaggy-strigillose types, pubescence mealy, primary peduncle 8-11 cm. long, bracts triangular to linear, to 6 mm. long. Flowers 20-25 mm. broad, buds to 8 mm. in diameter, pedicels 5-12 mm. long, bracteoles minute, subulate, to 2 mm. long; sepals 5, orbicular, rarely oblong, rounded to obtuse, 4-6 mm. long, 4-5 mm. wide, exposed parts in bud abundantly pubescent with trichomes of stellate to shaggy types, imbricated parts abundantly stellate pubescent, pubescence mealy, all abundantly to densely stellate pubescent on upper portion and glabrous on lower half inside, marginally and apically ciliolate to ciliate; petals 5, white, oblong to oblong-obovate, rounded, 9-11 mm. long, 5-7 mm. wide, stamens 100-200, filament 2.5-4.5 mm. long, anther 1.5 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, 1 mm. long, stigmas simple. Berries unknown.

Habitat.—Riverbank, at an altitude of 95 m.

Distribution.—Ecuador (Province of Esmeraldas).

Specimens examined.—ECUADOR, ESMERALDAS: Parroquia de Concepcion, below Playa Rica, Dec., fl., *Mexia 8488* (US, holotype; F, NY, S, U, UC, isotypes).

VI. Ser. MACROPHYLLAE Busc., Malpighia 25: 218. 1912.

Strigosae Busc., l. c. 218, p. p. min.
Mesophyllae Busc., l. c. 218, p. p.
Veranianae Busc., l. c. 219, p. p.
Brachitrichae Busc., l. c. 220, p. p. min.

Gynogynae Busc., l. c. 221, p. p. min.
Stenobasicae Busc., l. c. 221, p. p. min.

1. Stellate or radiate trichome types predominate over lower leaf surface.
   2. Leaves conic-strigose pubescent above, pitted to lacunose beneath. 34. *S. formosa*
   2. Leaves not conic-strigose pubescent above, neither pitted nor lacunose beneath.
      3. Inner surface of sepals glabrous to partly stellate pubescent (usually only on upper portion).
         4. Villous-barbate trichomes present at axils of secondary veins beneath, stamens more than 100 ..... 35. *S. chaparensis*
         4. Villous-barbate trichomes absent at axils of secondary veins beneath, stamens less than 60.
            5. Inflorescences usually pendulous, 5-30-flowered, bracts usually foliaceous, flowers 15-25 mm. broad, stamens 40-50. 36. *S. peduncularis*
            5. Inflorescences straight, 40-200-flowered, bracts minute and not foliaceous, flowers 10-13 mm. broad, stamens 13-30. 37. *S. putumayonis*
      3. Inner surface of sepals densely stellate pubescent.
         6. Leaves sparingly to abundantly pubescent with trichomes of setose to setulose mixed with stellate types beneath.
            7. Inflorescences 6-15(25)-flowered, flowers 15 mm. broad, stamens 35-40, leaf blade smooth above .....38. *S. herthae*
            7. Inflorescences 30-100-flowered, flowers 12.5 mm. broad, stamens 25-45, leaf blade puncticulate and scabrous .....39. *S. lehmannii*
         6. Leaves glabrescent, scabrous above, trichomes of strigose to strigillose mixed with radiate types beneath, inflorescences (5-)30-150-flowered, flowers 10-18 mm. broad, stamens (30-)50-85(-100) ..... 40. *S. scabra*

1. Unbranched and/or branched trichome (but not of stellate or similar) types predominate over lower leaf surface.
   8. Leaf pubescence distinctly heterotrichous beneath with trichomes of strigose, setose or clustered, sometimes mixed with stellate or radiate types.
      9. Texture of leaves membranaceous, trichomes of strigillose mixed with slender-stellate types beneath, inflorescences slender and flexuous, 20-50-flowered, flowers 15 mm. broad, stamens 30-40 ....41. *S. tambensis*
      9. Texture of leaves chartaceous to coriaceous, trichomes of setose or hirsute or clustered, often mixed with radiate types beneath, inflorescences robust, straight, more than 50-flowered, flowers 10-25 mm. broad, stamens over 50.
         10. Inflorescences (15-)30-70(-150)-flowered, flowers 10-18 mm. broad, stamens (30-)50-85(-100) ..... 42. *S. excelsa*
         10. Inflorescences (20-)50-200-flowered, flowers 15-25 mm. broad, stamens (65-)100-200(-240) ..... 43. *S. brachybotrys*
   8. Leaf pubescence distinctly homotrichous beneath with trichomes of un-

branched types, branched trichomes mostly absent or nearly so, then only restricted along midrib.

11. Inflorescence and lower leaf pubescence hirsute, trichomes of up to 5 mm. long, branched trichomes absent.
    12. Apex of leaves caudate (rarely acuminate), acumen to 45 mm. long, inflorescences compact, flower pedicels 6 mm. long. 44. *S. isoxanthotricha*
    12. Apex of leaves acuminate, acumen to 10 mm. long, inflorescences lax, flower pedicels 10-15 mm. long ..... 45. *S. meridensis*
11. Inflorescence and lower leaf pubescence setose to strigose, stellate trichomes sometimes present along major veins beneath, inflorescences compact, flower pedicels 1-4 mm. long ..... 46. *S. prainiana*

34. **Saurauia formosa** Sleumer, Notizbl. 12: 144. 1934.—Type: *Weberbauer 6637* (F, lectotype: GH, US, isolectotypes). Figure 23.

Shrubs; copiously pubescent. Branchlets angular, stout, abundantly to densely pubescent with trichomes of sericeous-strigose type, yellowish brown, to 5 mm. long. Leaves clustered behind tip of branchlets; blades elliptic to obovate or oblong-obovate, acuminate at apex with acumen to 15 mm. long, cuneate at base, rarely oblique, setaceous to ciliate-serrulate along margins, (23-)30-45 cm. long, (10-)13-19 cm. wide, chartaceous to subcoriaceous, in dry state dark yellowish brown above, light yellow-brown to grayish yellow-brown beneath, strongly scabrous above, somewhat soft beneath, secondary veins 24-28 pairs, tertiary veins elevated, more prominent than lesser venation (reticulation prominent beneath), sparingly to abundantly pubescent with trichomes of conic-tuberculate to conic-strigose (between veins) and strigose to sericeous-strigose types (along major veins) above, pitted to lacunose between minor veins and abundantly pubescent with trichomes of stellate (along and between veins) mixed with setose to sericeous types (along major veins) beneath; petioles robust, (3-)6-11 cm. long, 5-7 mm. in diameter, half-terete, densely sericeous-hirsute pubescent. Inflorescences straight, robust, 50-100-flowered, 20-33 cm. long, 5-15 cm. wide, densely to abundantly pubescent, trichomes of sericeous mixed with thin, minute and white stellate types, peduncle 10-16 cm. long, bracts triangular, to 10 mm. long. Flowers 15-20 mm. broad (22 mm., cf. Sleumer), buds to 7 mm. in diameter, pedicels to 5 mm. long, bracteoles subulate to triangular, to 7 mm. long; sepals 5, oblong to oblong-obovate, obtuse to rounded, 8-10 mm. long, 4-6 mm. wide, exposed parts in bud densely strigillose pubescent, imbricated parts densely stellate pubescent, all abundantly to densely stellate pubescent on upper portion and glabrous on lower half inside, marginally ciliolate; petals 5, white, oblong-spatulate, rounded, 10-12 mm. long, 3-4.5 mm. wide; stamens 60-80, filament 3-4 mm. long, anther 1.5-2 mm. long; ovary 5-6-loculed, ovoid to globose, 5-6-sulcate, glabrous, styles 5-6, to 4 mm. long, stigmas capitate. Berries not known.

Habitat.—Mountain forest (?), at altitudes of 2,800-2,900 m.

Distribution.—Peru (Departments of Junin and Huancayo).

Specimens examined.—PERU, JUNIN: Jauja, vic. of Rio Masameri, tributary of Rio Pangoa, April., fl., *Weberbauer 6637* (F, lec-

totype; GH, US, isotypes). HUANCAYO: Oxapampa, Aug., fl., *Soukup 2433* (F, US).

35. **Saurauia chaparensis** Soejarto, Bot. Mus. Leafl. Harvard Univ. 22: 270. 1969.—Type: *Steinbach 8920* (GH, holotype; F, K, NY, S, isotypes). Figure 24.

Shrubs; copiously pubescent. Branchlets moderately stout, terete, prominently scarred, abundantly pubescent with trichomes of shaggy to strigose types, but sometimes glabrescent. Leaves crowded behind tip of branchlets; blades obovate to oblong-obovate, blunt to very shortly acuminate at apex, cuneate at base, rarely oblique, serrulate with very fine serrulations along margins, 10-18 cm. long, 3-6 cm. wide, chartaceous, in dry state sooty above, olive-brown beneath, distinctly scabrous throughout, secondary veins elevated, more prominent than lesser venation, sparingly pubescent with trichomes of clustered and strigose types (along and between veins) and with pustulate epidermis above, abundantly pubescent with trichomes of stellate to tufted (along and between veins) and shaggy to strigillose types (along major veins) beneath, villous-barbate pubescent at axils of secondary veins beneath; petioles 2-3 cm. long, 1.5-2 mm. in diameter, terete to half-terete, scabrous and abundantly pubescent with trichomes of shaggy-strigillose type. Inflorescences straight, somewhat loose, 30-80-flowered, 12-20 cm. long, 5-12 cm. wide, densely mealy-pubescent with tuberculate trichomes, primary peduncle 5-10 cm. long, bracts linear, to 6 mm. long, very rarely foliaceous, to 25 mm. long. Flowers ca. 15 mm. broad, buds to 6 mm. in diameter, pedicels 5-15(-20) mm. long, bracteoles triangular, to 2 mm. long; sepals 5, outer two oblong-obovate, acute, 3.5-4.5 mm. long, 3-3.5 mm. wide, imbricate one suborbicular, rounded, 4-5 mm. long, 3.5-4 mm. wide, inner two suborbicular to orbicular-oblong, 4-5 mm. long, 3.5-4.5 mm. wide, exposed parts in bud densely shaggy pubescent, imbricated parts glabrous, all glabrous inside, marginally subentire, apically irregularly ciliolate; petals 5, oblong to oblong-obovate, rounded to truncate and often incised, 7-9 mm. long, 5-7.5 mm. wide; stamens 100-150, filament 2-3 mm. long, anther 1-2 mm. long; ovary 5-7-loculed, globose, 5-7-sulcate, glabrous, styles 5-7, obsolete to 4 mm. long, stigmas simple to capitate. Berries 5-7-loculed, globose, to 5 mm. across (immature), 5-7-sulcate.

Habitat.—Forest, at altitudes of 2,200-2,400 m.

Distribution.—Bolivia (Department of Cochabamba).

Specimens examined.—BOLIVIA, COCHABAMBA: Chapare, Incachaca, Jan., fl. fr., *Steinbach 8920* (GH, holotype; F, NY, S, isotypes), March, fl., *9513* (BM, F, G, GH, K, NY, S).

The following features characterize *S. chaparensis:* (1) leaves small, abundantly stellate pubescent with villous-barbate trichomes at axils of secondary veins beneath, (2) inflorescences loose, (3) flowers of medium size (ca. 15 mm. broad) and long-pedicellate (to 20 mm. long), (4) stamens high in number (more than 100).

A rather remarkable feature of *S. chaparensis* is the frequency of irregular repetition of some floral parts. Flowers with 6-7-loculed and

6-7-styled ovaries are found in almost equal proportions as those with 5-loculed and 5-styled ovaries, in the same inflorescence.

36. **Saurauia peduncularis** Tr. & Pl., Ann. Sci. Nat. Ser. 4, 18: 267. 1862; Prodr. Fl. Nov. Granat. 1: 264. 1862.—Type: *Triana 3252* (A, COL, GH, NY, US, all photos). Figure 25.

Shrubs to 3 m. tall, erect to curving, sometimes trailing, rarely bushy; sparingly pubescent. Branchlets slender, terete, glabrescent to abundantly pubescent, trichomes of setose to hirsute types, yellowish to bright brown, to 4 mm. long. Leaves clustered behind tip of branchlets; blades narrowly to broadly elliptic to obovate, cuspidate to acuminate at apex with acumen to 15(-20) mm. long, cuneate to obtuse at base, rarely oblique, serrate to biserrate along margins (7-)10-25 cm. long, (3.5-)5-10(-15) cm. wide, chartaceous to subcoriaceous, light to dark green on both sides, scarcely scabrous above, secondary veins (9-)13-20(-23) pairs, tertiary veins elevated, more prominent than lesser venation, scattered to abundantly pubescent with trichomes of strigillose (between veins) to strigose types (along veins) above, sparingly pubescent with trichomes of stellate (along and between veins) mixed with strigose types (along midrib) beneath; petioles 1.5-4 cm. long, 1.5-3 mm. in diameter, sparingly setose pubescent. Inflorescences usually pendulous, rarely ascending, lateral cymes squarrose, loose, (5-)10-25(-30)-flowered, 7-30 cm. long, 4-13 cm. wide, abundantly pubescent with trichomes of setose to hirsute mixed with radiate to stellate or clustered types, primary peduncle 4.5-18 cm. long, bracts foliaceous, elliptic to elongate-elliptic, acuminate to acuminate-cirrhous at apex, cuneate to attenuate at base, setaceous-serrulate along margins, to 45 mm. long, to 15 mm. wide, sparingly strigillose pubescent throughout. Flowers 15-25 mm. broad, buds to 7 mm. in diameter, pedicels 4-10 mm. long, bracteoles linear-subulate to foliaceous, 4-15 mm. long; sepals 5, pale green, outer two ovate to elliptic, subacute, 5-7 mm. long, 3-4.5 mm. wide, imbricate one and inner two suborbicular to broadly elliptic, obtuse, 5-8 mm. long, 4-6 mm. wide, exposed parts in bud abundantly to sparingly pubescent with trichomes of stellate and strigose types, imbricated parts abundantly stellate pubescent to glabrous, all glabrous to partly stellate pubescent (on upper portion) inside, marginally ciliolate; petals 5, white, spatulate to orbicular-obovate, rounded to retuse, 8-13 mm. long, 6-9 mm. wide; stamens 45-50, filament 2-3 mm. long, anther 2-3 mm. long; ovary 5-loculed, globose to ellipsoid, 5-sulcate, glabrous, styles 5, obsolete to 4(-5) mm. long, stigmas simple to subcapitate. Berries immature.

Habitat.—Mountain forest, secondary forest, along creek and shady, wet riverbank, on rocky soil, at altitudes of 1,000-1,600 (-2,400) m.

Distribution.—Colombia (Department of Nariño).

Vernacular names.—*Moquillo* (Ricaurte: Soejarto; Tuquerres: Triana & Planchon).

Specimens examined.—COLOMBIA, NARIÑO: Cartagena, along Guiza River, July, fl., *Soejarto 935, 937, 938, 943* (all in ECON, GH, PASTO), fl. *936* (COL, ECON, GH, PASTO), veg., *1456* (ECON, GH); W. of Ricaurte, El Palmar, Aug., fl., *Soejarto 1446* (ECON, GH);

Cordillera of Tuquerres, fl., *Triana 3252* (A, COL, GH, NY, US, all photos).

NO PRECISE LOCALITY: Rio Cuaiquar, May, fl., *André K1000* (K); El Tena, Sept., fl., *Benoist 4773* (P).

The type specimen of *S. peduncularis (Triana 3252)* was collected from "forest de la cordillere de Tuquerres, alt. 2400 metres," which is rather high for the species. All the recent collections were made from the Ricaurte area at measured altitudes of 1,000-1,600 m. Although only the photograph of the type was available for study, the identity of the species is unmistakable from the following characteristics: (1) loose and pendulous inflorescences with lateral cymes normally perpendicular to the main axis, (2) foliaceous bracts, and (3) relatively long primary peduncle (up to three times the length of the flower-bearing part), hence the specific name. The above amplified description has been based upon the recent collections.

37. **Saurauia putumayonis** R. E. Schultes, Caldasia 2: 42. 1944.—Type: *Cuatrecasas 11431* (COL, holotype; F, US, isotypes). Illustration: Caldasia 2:42. *pl. 1.* 1943.

Shrubs to small trees to 5 m., rarely bushy, branches slender, often curving; sparingly pubescent. Branchlets slender, terete, glabrescent to scattered pubescent with trichomes of strigillose to strigose types, white to light brown. Leaves clustered behind tip of branchlets; blades obovate to oblong-obovate, cuspidate to shortly acuminate at apex with acumen to 15 mm. long, cuneate to rarely oblique at base, serrulate along margins, (10-)13-25(-30) cm. long, (5-)7-15 cm. wide, chartaceous to membranaceous, somewhat scabrous above, secondary veins 16-22 pairs, tertiary veins elevated, more prominent than lesser venation, scattered to sparingly pubescent with trichomes of tuberculate to setulose (along and between minor veins) and strigillose to setose types (along major veins) above, scattered to sparingly pubescent with trichomes of stellate to radiate or clustered (along and between veins) mixed with strigillose to strigose or setose types (along major veins) beneath; petioles (1-)2-5 cm. long, 2-3 mm. in diameter, furrowed above, glabrescent to sparingly strigillose pubescent. Inflorescences straight, (20-)40-100(-200)-flowered, 15-20(-42) cm. long, 8-20 cm. wide, sparingly to abundantly scurfy-pubescent with trichomes of strigillose to setulose types, primary peduncle 5-15 cm. long, bracts triangular to linear, to 10 mm. long, rarely foliaceous, to 25 mm. long. Flowers 10-13 mm. broad, buds to 4 mm. in diameter, pedicels 3-10 mm. long, bracteoles triangular to linear, to 3 mm. long, sepals 5, pale green to rarely white or reddish maroon, ovate to elliptic or suborbicular, acute to obtuse or rounded, 4-5.5 mm. long, 2.5-4 mm. wide, exposed parts in bud sparingly scurfy-pubescent with trichomes of setulose to strigillose to shaggy mixed with radiate types, imbricated parts glabrous, all glabrous to scattered radiate pubescent on upper portion inside, marginally entire to ciliolate; petals 5, white to rarely pink, oblong to oblong-obovate, rounded to rarely incised, 6.5-7.5 mm. long, 4-5.5 mm. wide; stamens (13-)18-30(-33), filament 1.5-2 mm. long, anther 2-2.5 mm. long; ovary 5-loculed, globose, 5-sulcate, styles 5, obsolete to 5.5 mm. long, stigmas simple to capitate. Berries 5-loculed, globose, to 10 mm. across, 5-sulcate.

Habitat.—Subparamo, wet mountain forest, wet rain forest, border of rather densely forested mountain, secondary forest, steep and rocky slopes, road cut and riverbank, at altitudes of 1,400-2,900 (-3,000) m.

Distribution.—Colombia (Departments of Meta, Huila, and Putumayo).

Vernacular names.—*Moquillo* (Putumayo: Schultes & Villarreal).

Specimens examined.—COLOMBIA, META: Rio del Nevado, below the confluence of Rio Arroz, south slope of Paramo of Sumapaz, Sept., fr., *Fosberg 20941* (NY, US). HUILA: Rio Villalobos, region of the confluence of Rio Cauchos, Jan., fl., *Schultes & Villarreal 5199* (COL, GH, US). PUTUMAYO: Road San Francisco of Sibundoy to Mocoa, Feb., fl., *Bristol 539* (COL, ECON, GH); east-facing slope of the Cordillera, between Mocoa and Sachamates, Dec., fl., *Cuatrecasas 11416* (COL, US), *11431* (COL, F, US); Mocoa River drainage, between Sachamates and San Antonio, Jan., fl., *Ewan 16692* (BM, NY, US); San Francisco of Sibundoy, Feb., fl., *Miguel 63* (F); Cerro Portachuelo, road Sibundoy to Pepino of Mocoa, Aug., fl., *Fernandez-Perez 5837* (COL, ECON, GH), March, fl., *Schultes & Cabrera 19028* (ECON, F, GH, NY, US), July & Aug., fl., fr., *Soejarto 520, 1552, 1553, 1554, 1558, 1559, 1561, 1573, 1593* (all in ECON, GH), fl. fr., *1135, 1141, 1143, 1145, 1164*, and veg., *1144* (all in ECON, GH, PASTO), fl. fr., *1048, 1121, 1140* (all in COL, ECON, GH, PASTO), veg., *1117, 1547* (both in GH); above Santiago of Sibundoy, La Chorrera, July, fl. fr., *Soejarto 1525, 1526, 1529* (all in ECON, GH).

38. **Saurauia herthae** Sleumer, Feddes Repert. 45: 9. 1938.—Type: *Schultze-Rhonhof 2165* (K, lectotype).

Shrubs to 6 m. tall; copiously pubescent. Branchlets often crooked, slender, terete, abundantly strigose to setose pubescent, trichomes yellowish to rusty brown. Leaves clustered behind tip of branchlets; blades obovate to elliptic-obovate, acuminate at apex with acumen to 25 mm. long, cuneate to obtuse at base, serrulate along margins, serrulations widely separated around base, (12-)20-30 cm. long, (4.5-)7-12 cm. wide, chartaceous, in dry state sooty-green above, deep grayish olive-brown beneath, somewhat smooth above, secondary veins 14-22 pairs, tertiary veins elevated, more prominent than lesser venation, scattered to sparingly pubescent with trichomes of setulose type (especially along major veins) above, sparingly to abundantly pubescent with trichomes of stellate and dendroid (along and between veins) mixed with strigose to setose types (along major veins) beneath; petioles 1-2.5 cm. long, 1.5-2 mm. in diameter, sparingly strigose pubescent. Inflorescences somewhat straight to ascending, small, little-branched, 6-15-flowered, 6-8 cm. long, 1.5-3.5 cm. wide, densely pubescent with strigose to shaggy trichomes, primary peduncle 3-4 cm. long, bracts linear, to 5

mm. long. Flowers ca. 15 mm. broad, buds to 4 mm. in diameter, pedicels to 4 mm. in fruiting condition, bracteoles linear, to 4 mm. long; sepals 5, oblong-elliptic to suborbicular, acute to obtuse, 6-7.5 mm. long, 4.5 mm. wide, exposed parts in bud abundantly pubescent with trichomes of strigose and stellate types, imbricated parts densely stellate pubescent, all densely stellate pubescent inside, marginally ciliolate; petals 5, white, oblong-obovate, rounded, 7-8 mm. long, 4.5 mm. wide; stamens 35-40, filament 2-2.5 mm. long, anther 2.5-3 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, to 5 mm. long, stigmas capitate. Berries 5-loculed, subglobose, to 7 mm. across, 5-sulcate.

Habitat.—Rain forest, riverbank, at altitudes of 350-2,600 m.

Distribution.—Ecuador (Provinces of Napo-Pastaza, Tungurahua, and Santiago-Zamora).

Vernacular names.—*Shauri* (Santiago-Zamora: Cazalet & Pennington).

Specimens examined.—ECUADOR, NAPO-PASTAZA: Canelos (Oriente), Jan., fl., *Schultze-Rhonhof 2165* (K, lectotype). TUNGURAHUA: valley of Pastaza River, between Baños and Cashurco, Sept., fl., *Hitchcock 21883* (NY, US). SANTIAGO-ZAMORA: Taisha, bank of Guaguayme River, Jan., fr., *Cazalet & Pennington 7543* (NY, UC, US); canyon of Paute River, near confluence of Yubal River, Hacienda Frutillas, fl., *Fosberg & Prieto 22740* (US); eastern region between Rio Sordo and La Esperanza, trail to Huamboya, descent of Cordillera Oriental, Feb., fl., *Solis 7375* (F).

S. herthae is allied to *S. prainiana,* but the former can be distinguished in the predominantly stellate trichomes on the lower leaf surface and in the small, few-flowered inflorescences, in contrast to the predominantly setose trichomes on the lower leaf surface and the larger, many-branched inflorescences, in the latter.

39. **Saurauia lehmannii** Hieron., Bot. Jahrb. Syst. 20, Beibl. 49: 47. 1895.—Type: *Lehmann 6673* (K, lectotype; F, US isolectotypes; GH, NY, photos). Figure 26.

Small trees to 8 m. tall, ramification squarrose and open, branches thick; copiously pubescent. Branchlets terete, abundantly pubescent with setose to hirsute trichomes. Leaves clustered behind tip of branchlets; blades elongate-obovate to obovate, cuspidate at apex with acumen to 10 mm. long, cuneate at base, setaceous-serrate to -biserrate along margins, 15-25(-30) cm. long, 6-14 cm. wide, subcoriaceous, brownish green above, grayish green beneath (in dry state dark to dull reddish brown above, ashy brown beneath), puncticulate and scabrous above, secondary veins 15-20 pairs, tertiary veins elevated, more prominent than lesser venation, sparingly and minutely muricated (along and between minor veins) and abundantly pubescent with setose trichomes (along major veins, especially midrib) above, sparingly to abundantly

pubescent with trichomes of stellate (along and between veins) mixed with setose types (along midrib) beneath; petioles 2-4 cm. long, 1.5-3 mm. in diameter, sparingly to abundantly pubescent with trichomes of setose to hirsute types. Inflorescences straight, lateral cymes often squarrose, 30-100-flowered, 11-20(-24) cm. long, (4-)6-12 cm. wide, abundantly to densely pubescent with trichomes of setose to hirsute mixed with stellate types, primary peduncle 6-12 cm. long, bracts subulate, to 7 mm. long. Flowers ca. 12.5 mm. broad, buds to 3 mm. in diameter, pedicels 2-5 mm. long, bracteoles 1.5-3 mm. long; sepals 5, green to reddish, elliptic to oblong, 5-6.5 mm. long, 3-4.5 mm. wide, exposed parts in bud densely scurfy-pubescent with trichomes of setose mixed with stellate types, imbricated parts densely stellate pubescent, all densely stellate pubescent inside, marginally to submarginally ciliate; petals 5, creamy white, oblong, rounded to incised, 6-7.5 mm. long, 4-5 mm. wide; stamens 25-45, filament 1.5-2 mm. long, anther 2-3 mm. long; ovary 5-loculed, ovoid to subglobose, 5-sulculate, glabrous, styles 5, 1-4 mm. long, stigmas simple to capitate. Berries not known.

Habitat.—Wet tropical forest, rich dense jungle, forested slopes, at altitudes of 1,000-2,300 m.

Distribution.—Ecuador (Provinces of Pichincha, Azuay, El Oro).

Specimens examined.—ECUADOR, PICHINCHA: Santo Domingo de Colorado, 0.5 km. N. of town, April, fl., *Little, Jr. 6169* (F, K, US); Cordillera Occidental, Saloya, Aug., fl., *Solis 10964* (F). AZUAY: W. Andes of Cuenca, fl., *Lehmann 6673* (F, K, US; GH, NY, photos); between Chacanceo and Rio Blanco, on road to Molletura (between Putucay and Norcay rivers), June, fl., *Steyermark 52814* (NY). EL ORO: Palma River (tributary of Amarillo River), near Pampa de los Cedros, S. of Cerro Chivo-Turco, Aug., fl., *Steyermark 53784* (NY).

40. **Saurauia scabra** (HBK.) Dietr., Synops. Pl. 3: 272. 1843 (non Poepp. ex Choisy, 1855). Based upon *Palava scabra* HBK. Illustration: HBK., Nov. Gen. Sp. Pl. 7: *pl. 648, 649*. 1824, Caldasia 2:43, *fig. 7-11*. 1943. Figure 27.

Palava scabra HBK. in Kunth Synops. Pl. Aequinoct. 3: 213. 1822; Nov. Gen. Sp. Pl. 7: 221. 1824.—Type: *Bonpland s. n.* (P, lectotype; F, fragment, isolectotype).

Saurauja scabra (HBK.) Tr. & Pl., Ann. Sci. Nat. ser. 4(18): 266. 1862; Prodr. Fl. Nov. Granat. 1: 263. 1862 (non Poepp. ex Choisy, 1855). Based upon *P. scabra* HBK.

Saurauia humboldtiana Busc., Malpighia 27: 305. *pl. 11, fig. 23*. 1916, p. p.; l. c. 28: *pl. 1, fig. 23*. 1917.—Type: *Bonpland s. n.* (F, fragment; P). Same type specimen as that of *Palava scabra* HBK.

Saurauia humboldtiana var. *bonplandiana* Busc., Malpighia 27: 311. 1916, p. p. (type incl.).—Type: *Bonpland s. n.* (F, fragment; P). Same type as that of *Palava scabra* HBK.

Saurauia prainiana Busc. var. *humboldtiana* Busc., Malpighia 25: 396. 1913.—Type: *Triana s. n.* (n. v.), ex descr.

Saurauia narcissifragrans R. E. Schultes, Caldasia 2: 39, *43 (figs. 7-11).* 1943.—Type: *Schultes & Villarreal 5169* (ECON, holotype; COL, F, L, NY, S, US, VEN, isotypes).

Trees to 7(-15) m. tall, diameter to 20 cm. at base, trunk crooked to straight, bark slightly fissured, corky, brown, crown open; sparingly pubescent. Branchlets terete, glabrescent to scattered strigose pubescent, trichomes gray to rusty brown. Leaves crowded behind tip of branchlets; blades elliptic-oblong to narrowly obovate, acute to very shortly and abruptly acuminate at apex, cuneate to narrowly cuneate at base, very rarely oblique, serrulate to setaceous-serrulate along margins, (10-)15-24(-31) cm. long, (3.5-)5-8(-11) cm. wide, chartaceous to subcoriaceous, green to pale green and scabrous throughout, secondary veins (9-)15-22(-27) pairs, tertiary veins elevated, more prominent than lesser venation, scattered pubescent with trichomes of strigillose to rarely strigose types along and between veins above, scattered to sparingly pubescent with trichomes of strigillose to strigose (along major veins) mixed with radiate types (between minor veins) beneath; petioles (1-)1.5-3.5(-4.5) cm. long, 1.5-3.5 mm. in diameter, glabrescent. Inflorescences crowded behind tip of branchlets, erect to ascending, (5-)15-40(-60)-flowered, (5-)10-20(-29) cm. long, (1-)3-10(-14) cm. wide, scattered pubescent with trichomes of strigose to sericeous-strigose types, primary peduncle (1-)3.5-8(-11) cm. long, bracts subulate to triangular, 3-10 mm. long. Flowers 10-18 mm. broad, buds to 8 mm. in diameter, pedicels to 3 mm. long, bracteoles triangular, 2-4 mm. long; sepals 5, elliptic to obovate, obtuse to acute, 5-8 mm. long, 3-6 mm. wide, exposed parts in bud densely shaggy-strigose pubescent, imbricated parts densely stellate pubescent, all abundantly to densely stellate pubescent inside, marginally to submarginally ciliate; petals 5, white, elliptic to oblong, obtuse, 7-15 mm. long, 6-10 mm. wide; stamens (20-)28-45(-70), filament 2-4 mm. long, anther 1.5-3.5 mm. long; ovary 5-loculed, globose to ovoid, 5-sulculate, glabrous, styles 5, obsolete to 6(-7) mm. long, stigmas simple to subcapitate. Berries green, persistent, styles purple-red, 5-loculed, globose, to 10 mm. across, 5-sulcate.

Habitat.—Dense forest, cloud forest, submountain forest, secondary forest, open hillside, thicket, meadows, along streams and rivulet, shady and humid places, roadside and gardens, at altitudes of 1,400-2,800 m.

Distribution.—Venezuela (State of Merida), Colombia (Departments of Santander, Cundinamarca, Caldas, Tolima, Boyaca, Huila, Caqueta).

Vernacular names.—*Chupa-chupa* (Merida: Bernardi), *Moquillo* (Cundinamarca: Soejarto).

Specimens examined.—VENEZUELA, MERIDA: El Carrizal, Los Granates, ridge of Say-say, Feb., fl., *Bernardi 2065* (NY).

COLOMBIA, SANTANDER: Salto de Tequendama (Tequendamita?), July, fl., *Barkley & Torres-Romero 35338* (US); Surata

River Valley, above Surata, Jan., fl., *Killip & Smith 16596* (A, F, GH, NY, US); vic. of California, Jan., fl., *Killip & Smith 16933* (A, GH, NY, US); vic. of Charta, Feb., fl., *Killip & Smith 19024, 19103* (both in A, GH, NY, US); vic. of Tona, Feb., fl. fr., *Killip & Smith 19475, 19480* (both in A, GH, NY, US). CALDAS: Cordillera Central, Salento, July, fl., *Pennell 8878* (NY). BOYACA: Sierra Nevada del Cocuy, near Boavita, Aug., fl., *Grubb et al. 686* (US). CUNDINAMARCA: Sabana de Bogota, fl., *Ariste-Joseph A-223, B-125* (both in US); Cordillera Oriental, east facing slope, between El Salto and El Colegio, March, fl., *Cuatrecasas 8196* (COL, F, US); El Tablazo between Subachoque and San Francisco, Finca "El Carmen," Jan., fl., *Garcia-Barriga 11012* (US); Alban, roadside, 1 km. before village, Aug., fl., *Garcia-Barriga 12544* (US); road to Fusagasuga, between Aguaclara and La Aguadita, Oct., fl., *Garcia-Barriga 16121* (COL, ECON), May, fl., *Schneider 1056* (S); Nemocon, Cerro del Mortiño, Dec., fl., *Garcia-Barriga 17717* (COL, ECON); road Mosquera to La Mesa, Dec., fl., *Garcia-Barriga 17738* (COL, ECON), Oct., fl., *Uribe-Uribe 4124* (A, COL, ECON, GH, K); San Isidro, 8 km. S. of Gachala, May, fl., *Grant & Fosberg 9323* (NY, US); Facatativa highway, Sept., fl., *Haught 6140* (US); June, fl., *Uribe-Uribe 4816* (COL, ECON, GH); Tocaima, Dec., fl., *Perez-Arbelaez 2438* (US); Jute, on road Bogota to La Mesa, Aug., fl. fr., *Soejarto 283, 318, 319* (all in COL, ECON, GH); Salto de Tequendama, vic. of waterfall, fl. fr., *Soejarto & Idrobo 912, 913* (both in COL, ECON, GH), *Soejarto 2058* (ECON, GH); March, fl., *Killip 33977* (A, COL, F, BM, NY, S, US); Bojaca, road to Lake Pedro Palo, June, fl., *Uribe-Uribe 1764* (COL); Pacho, Oct., fl., *Uribe-Uribe 1828* (COL, ECON); Dec., fl., *Nujo s. n.* (K); Zipacon, vic. of Boca de Monte, Feb., fl., *Uribe-Uribe & Villarreal 2555* (COL, ECON); Santandercito, below Salto de Tequendama, June, fl., *Uribe-Uribe 5239* (COL, ECON). TOLIMA: La Palmilla (Quindio), Prov. de Mariquita, fl., *Triana 3253A* (G: the left element on the sheet); same locality, fl., *Triana s. n.* (NY, P) (note on sheet: *Saurauia scabra* HBK.). HUILA: Mountains, 10 km. SE of Santa Anna, Feb., fl., *Little, Jr. 7272* (NY, US); Rio Villalobos, vic. of Rio Suazita, Quebrada Guayabo, Jan., fl., *Schultes & Villarreal 5169* (COL, ECON, F, NY, S, U, US, VEN), *5317* (COL). NO PRECISE LOCALITY: Santa Anna, fl., *Bonpland s. n.* (F, fragment; P) (annotated as: *Palava scabra* HBK. [N.G. & Sp]); no loc., fl., *Mutis 1182, 4598, 4599, 5773* (all in US); fl., *no collector s. n.* (K); no loc., fl., *Purdie s. n.* (K).

When Humboldt et al. (1824) published the amplified description of *Palava scabra* (Nov. Gen. Sp. Pl. 7: 221. *pls. 648* and *649*. 1824), two descriptions were provided. The first was based upon Bonpland's collection from Santa Anna (?Huila, *plate 648*), Colombia; the second was communicated by Mutis and depicted in the illustration on *plaie 649*. It was noted that the second description is "proxima *Saurauia excelsae*," but origin was not indicated. Sprengel (1827) considered *P. scabra* HBK. as synonymous with *Saurauia excelsa,* but Dietrich (1843) recognized *Saurauia scabra* (HBK.) Dietr. as a distinct species, as also did Triana & Planchon (1862a,b). Buscalioni (1916) retained the second description as *S. scabra* HBK. and segregated the first description under the new name *Saurauia humboldtiana* Busc. According to the Code, the name *S. humboldtiana* is nomenclaturally superfluous and should be rejected, since an earlier legitimate name, *S. scabra* (HBK.) Dietr. (not of Poepp. ex Choisy, 1855 = *S. peruviana* Busc.), is available. Taxonomically, little difference exists between the two descriptions supplied by Humboldt et al., thus, there is no merit of their separation into different species.

41. **Saurauia tambensis** Killip, J. Wash. Acad. Sci. 16: 571. 1926. Type: *Hitchcock 21281* (US, holotype; NY, isotype). Figure 28.

Shrubs; sparingly to copiously pubescent. Branchlets slender, terete to angular, prominently scarred, sparingly tuberculate to strigose pubescent. Leaves crowded behind tip of branchlets; blades oblong-obovate, acuminate at apex with acumen to 20 mm. long, cuneate at base, setaceous-serrulate along margins, 18-25 cm. long, 7-9 cm. wide, membranaceous, somewhat smooth above, secondary veins 18-20 pairs, tertiary veins elevated, more prominent than lesser venation, scattered to sparingly strigillose to strigose pubescent above, sparingly to abundantly pubescent with trichomes of strigose to strigillose mixed with silvery slender-stellate types (especially along veins) beneath; petioles 2-2.5 cm. long, half-terete, 1.5-2 mm. in diameter, abundantly to sparingly strigose pubescent. Inflorescences slender and somewhat flexuous, loose, 20-50-flowered, 12-20 cm. long, 4-5.5 cm. wide, pulverulent and densely pubescent with trichomes of setulose to shaggy-setulose and slender-stellate types, primary peduncle slender, 7-10 cm. long, bracts linear, to 5 mm. long. Flowers 15 mm. broad, buds to 4 mm. in diameter, pedicels to 10 mm. long, bracteoles linear, to 2 mm. long; sepals 5-6, oblong to oblong-obovate, obtuse to rounded, 4-5 mm. long, 3-4 mm. wide, exposed parts in bud sparingly pubescent with trichomes of setulose to shaggy-setulose and slender-stellate types, imbricated parts glabrous, all glabrous inside, marginally ciliate; petals 5, white, oblong-obovate, rounded and sometimes incised, 7-9 mm. long, 5-6 mm. wide; stamens 30-40, filament 3-4 mm. long, anther 2 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, 2.5 mm. long, stigmas simple. Berries not known.

Habitat.—Altitudes of 600-1,200 m.

Distribution.—Ecuador (Provinces of Tungurahua and El Oro).

Specimens examined.—ECUADOR, EL ORO: between Portovelo (gold mine near Zaruma) and El Tambo, Sept., fl., *Hitchcock 21281* (NY, US).

42. **Saurauia excelsa** Willd. Ges. Naturf. Freunde Berlin Neue. Schriften 3: 407. *pl. 4.* 1801.—Type: *Bredemeyer s. n.* (COL, GH, NY, all photos). Figure 29.

Saurauia excelsa var. *moritziana* Busc., Malpighia 25: 7. 1912.—Type: *Moritz 290* (K, P, US).

Saurauia excelsa var. *xanthotricha* Busc., Malpighia 25: 7, 232. 1912.—Type: *Funck & Schlim 106* (BM, F, K, P).

Saurauia excelsa fma. *veranii* Busc., Malpighia 25: 218. 1912.—Type: unknown, ex descr.

Saurauja moritziana Turcz., Bull. Soc. Imper. Naturalistes Moscou 31(1): 243. 1858.—Type: *Moritz 290* (K, P, US).

Saurauja floribunda Lind. & Pl., Trois. Voy. Linden 1: 57. 1863.—Type: *Funck & Schlim 1615* (G, P).

Saurauja schlimii Sprague, Trans. Proc. Bot. Soc. Edinburgh 22: 427. 1904.—Type: *Schlim 789* (F, G, K, P, US; COL, GH, photos).

Saurauia brachybotrys Turcz. var. *macrantha* Busc., Malpighia 28: 31. 1917., p. p. min. (typ. excl.).

Saurauia scabra Busc., non Dietr., nec Poepp. ex Choisy, Malpighia 28:8. 1917, p. p. (incl. fma. *veranii* Busc., l. c. 11).

Saurauia rusbyi Britt. var. *spectabilis* Busc., Malpighia 30: 178. 1927, p. p. (typ. excl.).

Trees to 15 m. tall, diameter to 30 cm. at base, trunk crooked to straight, crown spreading; copiously pubescent. Branchlets subterete to angular, abundantly strigose to hirsute pubescent, rarely glabrescent; trichomes rusty brown. Leaves crowded behind tip of branchlets; blades oblong to obovate to broadly oblong-obovate, acute to very shortly and abruptly acuminate at apex, cuneate to narrowly cuneate at base, rarely oblique, finely serrulate to setaceous-serrulate along margins, (10-)15-35(-40) cm. long, (4-)8-15 cm. wide, chartaceous, medium to dark green above, dull to pale green beneath, scabrous above, secondary veins (15-)20-28(-30) pairs, tertiary veins elevated, more prominent than lesser venation, sparingly setose to hirsute pubescent along veins above, scattered to abundantly pubescent with trichomes of hirsute to tufted or shaggy mixed with radiate to stellate types (along and between veins) beneath; petioles (1.5-)2.5-4.5(-6) cm. long, 2-4 mm. in diameter, abundantly strigose to hirsute pubescent. Inflorescences somewhat straight, (15-)30-70(-150)-flowered, (8-)15-25(-30) cm. long, (3-)5-10(-15) cm. wide, abundantly to densely strigose to hirsute pubescent, primary peduncle (4-)7-14(-19) cm. long, bracts linear to subulate, 5-25 mm. long. Flowers 10-18 mm. broad, buds to 8 mm. in diameter, pedicels to 8 mm. long, bracteoles subulate to triangular, 3-5 mm. long; sepals 5, ovate to ovate-oblong, obtuse, 6-10 mm. long, 3-4 mm. wide, exposed parts in bud densely pubescent with trichomes of strigose to hirsute mixed with stellate types, imbricated parts stellate pubescent, all

densely stellate pubescent inside, marginally to submarginally ciliolate to ciliate; petals 5, white to very rarely rose-white, oblong to obovate, obtuse, 5-8 mm. long, 3-5 mm. wide; stamens (30-)50-85(-100), filament 2-3 mm. long, anther 2-3 mm. long, stigmas simple to capitate. Berries green to pale red, 5-sulcate, globose, 5-10 mm. across, 5-sulcate.

Habitat.—Cloud forest, temperate forest, secondary forest, mountain rain forest, residual forest, forest clearing and edge of forest, among rocks in moderately dense forest, along streams, in meadows and in parks, at altitudes of 500-2,500 m.

Distribution.—Venezuela (States of Distrito Federal, Aragua, Merida, Barinas), Colombia (Departments of Magdalena, Norte de Santander, Santander).

Vernacular names.—*Cura* (Merida: Gehriger), *Moco* or *Moquillo* (Venezuela: Perez-Arbelaez), *Moquillo* (Caracas: Williams).

Specimens examined.—VENEZUELA, DISTRITO FEDERAL: Caracas, fl., *Bredemeyer s. n.* (COL, GH, NY, all photos), *Moritz s. n.* (FI); San Sebastian, fl., *Funck 306* (G, P); Galipan, Jan., fl., *Funck & Schlim 106* (F, K, P); Colonia Tovar, fr., *Karsten s. n.* (F, GH); Chacaito gorge around Caracas, April, fl., *Pittier 9494* (US, VEN); La Mesa, above Quamita, National Park, Feb., fl., *Pittier & Nakichen 15734* (VEN); El Junquito, June, fl., *Lasser 1096* (US, VEN), June, fl. fr., *Steyermark 57028* (F, NY, US); Avilla, March, fl. fr., *Delgado 44* (US, VEN), April, fl., *Lasser 73* (VEN); Los Infiernitos, May, fl., *Tamayo 145* (US, VEN); S. slope of Cerro Avilla, Aug., fl., *Vogl 138* (F); Las Flores of Avilla, March, fl., *Williams 9925* (F). ARAGUA: Colonia Tovar, Dec., fl., *Allart 391* (A, NY, US, VEN), fl., *Fendler 5* (K), Jan., fl., *Lasser & Foldats 4280* (VEN), March, fl., *Pittier 9384* (NY, P, US), Dec., fl., *Pittier 10056* (NY, US, VEN); Alto de Choroni, Oct., fl., *Chardon 202* (US, VEN), *8348* (VEN); highway between Maracay and Choroni, Jan., fl., *Lasser 171* (US, VEN), Feb., fl., fr., *Pittier 13926* (F, US, VEN); Chuao, Valle de En Medio, March, fl., *Pittier 12132* (A, NY, US, VEN). MERIDA: Cerro de Las Flores, April, fl., *Bernardi 452* (FI, NY, P); Chorros de Milla, May, fl., *Bernardi 536* (NY); Sto. Domingo, Sept., fl., *Bernardi 992* (NY, VEN); La Mucuy, fr., *Breteler 3460* (VEN), April, fl., *Gines 4770* (US), Sept., fl., *Lasser 531, 606* (both in VEN), Sept., fl., *Little, Jr. 15507* (VEN), April, fl., *Steyermark 55942* (F, VEN); Jaro(?), July, fl., *Funck & Schlim 898* (G); Sierra de Merida, June, fl. fr., *Funck & Schlim 1615* (G, P); Mucuruba, July, *Gehriger 316* (A, F, NY, US, VEN); between La India and El Morro, May, fl., *Ijjazz-Madriz 438*

(VEN); Paramo de Aricagua, March, fl., *Jahn 1023* (US); ? Colonia Tovar, Nov. fl., *Moritz 290* (K, P, US), Jan., fl., *Smith et al. 3478* (F). MARINAS: vic. of Baruta, April, fl., *Lasser 51* (F); vic. of Barinitas, April, fl., *Lasser 51A* (US). NO PRECISE LOCALITY: fl., *Kuntze 74* (F, NY); fl., *Linden 38* (G, P); March, fl. fr., *Pittier 44* (F); fl., *Röhl s. n.* (VEN).

COLOMBIA, MAGDALENA: Rio Hacha, Sierra Nevada de Santa Marta, March, fl., *Schlim 789* (F, G, K, P, US; COL, GH, photos). NORTE DE SANTANDER: Sarare region, basin of Rio Margua, between Campohermoso and Rio Negro, Nov., fl., *Cuatrecasas 12902* (COL, F, US), *13110* (F, US; COL, photo). SANTANDER: vic. of Las Vegas, Dec., fl., *Killip & Smith 16081* (US), *16118* (A, NY, US); vic. of La Baja, Jan., fl., *Killip & Smith 18322* (F, NY, US); NO PRECISE LOCALITY, Aug., fl., *Uribe-Uribe 2433* (COL, ECON).

NO PRECISE LOCALITY: fl., *Moritz s. n.* (GH, P, US).

Members of *S. excelsa* are normally small trees of 4-10 m. tall, but Lasser and Foldats have observed a tree of 20 m. tall, and Pittier *(Pittier 2132)* has noted a trunk of 30-35 cm. in diameter. The great variability in the size of the inflorescences is remarkable; the usual size is 15-25 cm. long and 30-70-flowered, but a specimen *(Lasser 8351)* with an inflorescence of 40 cm. long and ca. 150-flowered is represented among the collections. In the latter case, the peduncle is thick and woody (8 mm. in diameter), and the lateral cymes are widely spreading.

43. **Saurauia brachybotrys** Turcz., Bull. Soc. Imper. Naturalistes Moscou 31(1): 245. 1858.—Type: *Linden 972* (BM; F, fragment; G, K, P; GH, photo). Figure 30.

Saurauia brachybotrys var. *macrantha* Busc., Malpighia 28: 31. 1917, p. p. maj.—Type: *Langlassée 57* (G, P, US).

Saurauia brachybotrys var. *scabra* Busc., l. c. 33, p. p. maj.—Type: *Linden 972*.

Saurauia goudotiana Lind. & Pl., Trois. Voy. Linden 1: 58. 1863.—Type: *Linden* 972.

Saurauia peduncularis Tr. & Pl. var. *veraniana* Busc., Malpighia 26: 26. 1913.—Type: *Karsten s. n.* (BM) (Colombia: Barbacoas?).

Trees to 15 m. tall, diameter to 25 cm. at base, trunk straight, bark narrowly splitting into irregular pieces, gray to brown, wood whitish yellow to light brown, crown open; copiously pubescent. Branchlets stout, terete to subangular, prominently scarred, abundantly strigose to setose pubescent, rarely aculeate, trichomes gray to

deep brown. Leaves crowded behind tip of branchlets; blades obovate to elliptic, acute to shortly acuminate at apex, cuneate to obtuse and often oblique but rarely with basal flap at base, serrate to serrulate along margins, (10-)15-30(-40) cm. long, (3.5-)8-15(-18) cm. wide, coriaceous, dark green above, green beneath, scabrous above, secondary veins (22-)24-30(-35) pairs, tertiary veins elevated, more prominent than lesser venation, sparingly pubescent with trichomes of strigose to setose types along and between veins above, abundantly pubescent with trichomes of shaggy to tufted mixed with hirsute and radiate types along and between veins beneath (epidermis pustulate); petioles (1.5-)2-5(7.5) cm. long, 2.5 mm. in diameter, abundantly setose to hirsute pubescent, rarely aculeate. Inflorescences usually straight, showy white, (20-)50-200-flowered, (8.5-)15-30(-37) cm. long, (3-)5-15(-25) cm. wide, densely to abundantly pubescent with trichomes of strigose to shaggy or tufted types, rarely aculeate, primary peduncle (5-)7-10(-13) cm. long, bracts triangular to subulate, to 8 mm. long. Flowers 15-25 mm. broad, buds to 7 mm. in diameter, pedicels to 10(-13) mm. long, bracteoles triangular, to 5 mm. long; sepals 5, greenish white to green, elliptic to ovate, obtuse, 7-8.5 mm. long, 4-6 mm. wide, exposed parts in bud densely pubescent with strigose to shaggy or tufted trichome types, imbricated parts pulverulent and densely stellate pubescent, all densely stellate pubescent within, marginally ciliolate to ciliate; petals 5, white to rosy, oblong to obovate to obcordate, frequently incised, often ciliolate apically, 9-11 mm. long, 4-7 mm. wide; stamens (65-)100-200(-240), filament 3-4 mm. long, anther 1.5-2.5 mm. long; ovary 5-loculed, ovoid, 5-sulcate, glabrous, styles 5, 0.5-5.5(-7) mm. long, stigmas simple to capitate. Berries green, often with purplish red tinge, globose to obovoid, to 15 mm. across, 5-sulcate.

Habitat.—Dense forest, residual forest, edge of forest, wooded ridgetop, thickets, along streams, secondary forest, brushy second-growth slope, roadside, cornfield, meadow and open hillside, gardens, and wet mountain forest, at altitudes of 1,500-2,500(-3,000?) m.

Distribution.—Colombia (Departments of Antioquia, Caldas, Quindio, Tolima, Valle, Cauca, Nariño, Putumayo).

Vernacular names.—*Dulumoco* (Caldas: Dryander; Valle: Cuatrecasas, Espinal), *Moco* (Cauca: Figueiras), *Mosquito* (Cauca: Perez-Arbelaez & Cuatrecasas), *Moquillo* (Sibundoy Valley: Bristol, Schultes, Soejarto), *Yunush, Yenesha,* or *Je-nuss* (Sibundoy Valley, Kamsa Indian names: Bristol, Schultes).

Specimens examined.—COLOMBIA, ANTIOQUIA: Alto de Minas, June, fl., *Espinal 66* (MEDEL); Rio Porce, Nov., fl., *Espinal 774* (ECON, UV); Cordillera Central, valley of Rio Nechi, 6 km. S. of Yarumal, March, fl., *Fosberg 21597* (NY, US); between Sonson and Medellin, June, fl., *Soejarto 2042, 2049, 2052* (all in ECON, GH, MEDEL); Angelopolis, Jan., fl., *Toro 910* (NY); Titiribi, June, fl., *Toro 1204* (MEDEL, NY). CALDAS: Salamina, June, fl., *Tomas 1846* (MEDEL, US); Sta. Rosa de Cabal, Los Alpes, Aug., fr., *Dryander 2740* (F, US); Cordillera Occidental, 1 km. N. of San Clemente, 13 km.

E. of Anserma, March, fl., *Fosberg 21673* (NY, US). QUINDIO: La Palmilla, Nov., fl., *Goudot s. n.* (P: No. 87-103-66). TOLIMA: Mariquita, Jan., fl., *Linden 972* (BM; F, fragment; G, K, P; GH, photo); El Libano, Alto de San Jose, July, fl., *Garcia-Barriga 12250* (COL, US). VALLE: basin of Rio Calima, El Cairo, between Darien and Mediacanoa, Jan., fr., *Cuatrecasas 13871* (F, GH, UC, US); Represa del Calima, Aug., fr., *Espinal 1964* (ECON, UV); basin of Rio Sanquinini, La Laguna, Dec., fr., *Cuatrecasas 15583* (F); basin of Rio Cali, Pichinde, Alto de Las Brisas, Oct., fl., fr., *Cuatrecasas 18250* (F), Jan., fl., *Espinal 2324* (ECON, UV); Los Carpatos and El Olivo, July, fl., *Cuatrecasas 21729* (ECON, F, UV); ridge of Cordillera, La Carbonera, between Las Brisas and Alban, Oct., fl., *Cuatrecasas 22155* (ECON), 22282 (ECON, F); basin of Rio Dagua, La Elsa, March, fl., *Cuatrecasas 23997* (F); vic. of Filiquis, Oct., fl., *Dryander 1612* (US); vic. of El Saladito, Cali, La Cumbre, Feb., fr., *Cuatrecasas 19605* (F, GH, US, UV), June, fl., *Soejarto 2056, 2057* (both in ECON, GH), May, fl., *Pennell 5721* (US), June, fl., *Killip et al. 39211* (F, US); El Silencio, Yanaconas, *Killip & Garcia 33755* (A, COL, F, GH, S, US). CAUCA, CORDILLERA OCCIDENTAL: Oct., fr., *Dryander 2072* (US); Timbio, Hatoviejo, July, fl., *Perez-Arbelaez & Cuatrecasas 6091* (F, US); Carpinterias between Munchique and Altamira, July, fr., *Perez-Arbelaez & Cuatrecasas 6148* (COL, F, US); El Tambo, fl., *Yepes-Agredo 294* (F, US), Aug., fl., *Idrobo & Fernandez 55* (COL, US); CORDILLERA CENTRAL: West facing slope, between Popayan and Purace, Dec., fl., *Cuatrecasas 13769* (F, GH), July, fr., *Garcia-Barriga & Hawkes 12700* (COL, US); Moscopan, basin of Rio San Jose, Aguabonita, Jan., fl., *Cuatrecasas 23513* (F); Tunia, Quebrada de Bermejal, ranch of La Primavera, May, fl., *Figueiras 8510;* Cauca Valley, Rio Hondo to Popayan, July, fl., *Killip 8258* (GH, NY, US); La Capilla (25 km. N. of Popayan), May, fl., *Killip 38485* (US); vic. of Popayan, July, fl., *Kjell von Sneidern 5645* (US), May and June, fl., *Lehmann 5537* (F, K, US); Miraflores, above Palmira, Jan., fl., *Pittier 889* (US). NARIÑO: vic. of Ricaurte, road Pasto to Tumaco, June, fl., *Espinosa E2929* (NY), Oct., fl., *Kjell von Sneidern 4519* (F, US), Aug., fl. fr., *Soejarto 1441, 1447, 1458, 1459, 1460, 1461, 1462* (all in ECON, GH); La Union, July, fr., *Soejarto et al. 1204* (ECON, GH, PASTO); between La Union and Buesaco, July, fl., *Soejarto et al. 1206* (ECON, GH, PASTO); Sandona, July, fl. fr., *Soejarto 1180, 1181* (both in ECON, GH, PASTO); between Sandona and La Florida, fl., *Soejarto 1182* (ECON, GH, PASTO); Pasto to El Encano, Paramo de El Tabano, fl., *Mora 2893* (PASTO),

PUTUMAYO, VALLE DE SIBUNDOY, Jan., fl., *Bristol 459* (ECON, GH, PASTO), May, fr., 1048 (ECON, GH), Feb., fl., *Chindoy 105* (ECON), Feb., fl., *Schultes 3203* (COL, ECON, GH); headwaters of Putumayo River, San Francisco, Jan., fl., *Cuatrecasas 11578* (US); above Santiago of Sibundoy, Aug., fl. fr., *Soejarto & Porter 513* (ECON), *510, 512, 514, 518A, 519* (all in ECON, GH), *511,* July, fl., *Soejarto 1174* (ECON, GH, PASTO), Aug., fr., *Soejarto 1533* (ECON, GH). NO PRECISE LOCALITY: Cordillera Occidental, Nov., fl., *Langlassée 57* (G, K, P, US), March, fl., *Marin 8* (MEDEL), *Karsten s. n.* (BM).

MEXICO, OAXACA: fl., *Galeotti 7235* (G; US-photo)(?).

Saurauia brachybotrys is most commonly found in disturbed habitats: one reason for the rich herbarium representation. Because of its wide range, the species is often influenced by other species with which it is in contact, or sympatric in distribution, and this is reflected in the variable nature of the indument. In the Antioquia region, for example, it is influenced by *S. ursina,* in the Valle-Caldas area by *S. cuatrecasana,* while in the Putumayo-Nariño region by *S. tomentosa.* In several respects, *S. brachybotrys* is related to *S. scabra* and *S. excelsa.* However, the presence of setose to strigose, shaggy to tufted and stellate to radiate trichomes on the lower leaf surface, and the extremely high number of stamens (100-200) characterize *S. brachybotrys.*

44. **Saurauia isoxanthotricha** Busc., Malpighia 25: 410. 1912.—Type: *Mathews 1216* (K, holotype). Illustration: Malpighia 25: *pl. 5, fig. 6.* 1912; Caldasia 2:33, *figs. 7-12.* 1943.

Saurauia anolaimensis R. E. Schultes & Garcia-Barriga, Caldasia 2: 27. 1943.—Type: *Garcia-Barriga 8994* (COL, holotype; US, isotype).

Saurauia intonsa R. E. Schultes, Caldasia 2: 318. 1944.—Type: *Fosberg 19914*; ex descr.

Shrubs to 4 m. tall, erect to ascending or curving or straggling, moderate to much-branched, often spreading, rarely bushy; copiously pubescent. Branchlets slender, terete, abundantly to densely pubescent with trichomes of hirsute to sericeous-hirsute types, trichomes golden-yellow to golden-brown, sometimes dark reddish to purplish brown, moderately rigid, to 10 mm. long. Leaves clustered behind tip of branchlets; blades elliptic to obovate-elliptic, caudate at apex with acumen to 45 mm. long, broadly cuneate to obtuse at base, serrate to hirsute-serrulate along margins, (4.5-)10-25(-35) cm. long, (2-)4-9(-15) cm. wide, chartaceous to membranaceous, dark green to dark reddish brown above, pale green to golden-reddish brown beneath, somewhat smooth above, secondary veins (7-)9-15(-25) pairs, tertiary veins elevated, more prominent than lesser venation, abundantly to densely pubescent with trichomes of hirsute to

sericeous-hirsute or hirtellous types along and between veins above, abundantly to densely pubescent with trichomes of hirsute to sericeous-hirsute or hispid types (to 5 mm. long along midrib, to 3 mm. long between veins) beneath; petioles (0.75-)2-3.5(-4.5) cm. long, 1-4 mm. in diameter, densely hirsute pubescent. Inflorescences straight, may be erect, (5-)10-50-flowered, (6-)10-18(-23) cm. long, 3.5-6 cm. wide, densely hirsute to sericeous-hirsute pubescent, primary peduncle 3-10 cm. long, bracts linear to subulate, to 15 mm. long. Flowers 15-25 mm. broad, buds to 6 mm. in diameter, pedicels to 6(-8) mm. long, bracteoles linear, to 7 mm. long; sepals 5, elliptic to oblong, subacute to obtuse, 7-10 mm. long, 6-8 mm. wide, exposed parts in bud densely pubescent, trichomes of setose to sericeous-hirsute and often mixed with stellate types, imbricated parts scattered to abundantly stellate pubescent, all sparingly stellate pubescent on upper half and glabrous on lower half inside, marginally ciliolate; petals 5, white to rosy, elliptic to narrowly ovate to oblong, obtuse, 12-15 mm. long, 6-8 mm. wide; stamens 20-30(-35), filament 2-3 mm. long; ovary 5-loculed, globose, 5-sulculate, glabrous, styles 5, obsolete to 4.5 mm. long, stigmas simple to capitate. Berries 5-loculed, green with purplish red tinge, globose, to 8 mm. across, 5-sulcate.

Habitat.—Cloud forest, wet mountain forest, wet riverbank, subparamo, mountain forest clearing, wet scrub forest, at altitudes of 2,000-3,000 m.

Distribution.—Colombia (Departments of Santander, Cundinamarca, Huila, Putumayo), Ecuador (Province of Imbabura), Peru (Department of Amazonas).

Specimens examined.—COLOMBIA, SANTANDER: vic. of Charta, Feb., fl., *Killip & Smith 19319* (NY, US). CUNDINAMARCA: Santana station, above Sasaima, July, fl., *Dugand & Jaramillo 3875* (US); San Francisco, ranch of El Carmero, between Subachoque and San Francisco, Jan., fl., *Garcia-Barriga 11014, 11016, 11022* (all in US); San Bernardo of Sasaima, between Quebradas La Maria and La Victoria, Jan., fl., *Garcia-Barriga 12565* (US); Sabaneta of San Francisco, W. of Sabana de Bogota, May, fl fr., *Uribe-Uribe 4801* (COL, ECON, GH), *4802* (COL, ECON). BOYACA: Chiquinquira, July, fl., *Ariste-Joseph A967* (P, US). TOLIMA: road El Libano to Murillo, km. 11 of the highway, July, fl., *Garcia-Barriga 12253* (US); Buenavista to Azufral, old Quindio trail, Aug., fl., *Killip & Hazen 9851* (NY). HUILA: Cordillera Central, 30 km. NW. of Palermo, Oct., fl., *Little, Jr. 8801* (P); Quebrada Guache, 3 km. SW. of Acevedo, canyon bottom, Aug., fl., *Little, Jr. 8482* (NY, US). PUTUMAYO: Paramo de San Francisco (La Depresion), road San Francisco to Mocoa, Jan., fl., *Fray-Miguel 32* (F); Cerro Portachuelo, vic. of Buenos Aires and Alto de Siberia, July, fl., *Soejarto 1065, 1146, 1169* (all in ECON, GH, PASTO), Sept., fl., *1531, 1532, 1534, 1535, 1538, 1548, 1551, 1563, 1565, 1566* (all in

ECON, GH), veg., *1536, 1537, 1555* (all in ECON, GH); below Paramo de Capuchino, Santaclara, roadside Pasto-Sibundoy, fl., *Soejarto 1510, 1522, 1523* (all in ECON, GH). NO PRECISE LOCALITY: fl., *Bonpland s. n.*(P); fl., *Mutis 2213* (US).

ECUADOR, IMBABURA: Cordillera Oriental, Alegria, E. of Volcan de Cayambe, May, fl., *Drew E-237* (US).

PERU, AMAZONAS: Bagua, along Quebrada Tambillo, valley of Rio Marañon, above Cascadas de Mayasi, Sept., fl., *Wurdack 2052* (NY, US). NO PRECISE LOCALITY: Pangsa (?), fl., *Mathews 1216* (K).

The collection *Soejarto 1551* from Cerro Portachuelo (Putumayo) is remarkably identical in practically every respect to *Mathews 1216,* collected from Peru, which was described by Buscalioni as *S. isoxanthotricha.* It is characterized by the apically caudate leaves and the complete absence of any multicellular branched trichomes, except on the sepals. Other Colombian collections, notably *Soejarto 1555, 1563, 1565, 1566,* are without question referrable to this species, due primarily to highly similar type of indument, the apically caudate leaves, and the floral characters. Several other collections, however, vary with regard to the size and density of the leaf indument between the veins beneath. The characteristic hirsute to setaceous-hirsute trichomes along the branchlets, the petioles, and along the midrib and the inflorescences are very useful for identification. The color of the branchlets, shoots, and young leaves of the plants collected in the Cerro Portachuelo region is usually dark to bright maroon-red, due to the dense indument of the same color, on these parts of the plant.

Several of the specimens collected from Putumayo (e.g., *Soejarto 1146, 1536, 1537*) have rather short and somewhat stiff (hispid) trichomes on the lower surface of the leaves, in contrast to the relatively weak and long (hirsute) trichomes found in *Soejarto 1551.* In addition, they have scattered radiate to stellate trichomes on the lower leaf surface. Field observations seem to indicate that these individuals, and others found along the road cut, may represent hybrid segregates, probably involving *S. putumayonis.* The specimen *Fosberg 19914,* described by Schultes as *S. intonsa,* has acuminate leaf apex and somewhat attenuate leaf base, but other characters agree very well with the range of variation of *S. isoxanthotricha.*

45. **Saurauia meridensis** Steyermark, Fieldiana (Botany) 28(1):

368. 1952.—Type: *Steyermark 56344* (F, holotype; VEN, isotype). Figure 31.

Shrubs to 3 m. tall, copiously pubescent. Branchlets abundantly setose to hirsute pubescent (young leaves and shoot densely sericeous pubescent); trichomes red-brown, to 4 mm. long, golden brown. Leaves clustered behind tip of branchlets; blades obovate, shortly and abruptly acuminate at apex with acumen to 10 mm. long, obtuse to cuneate at base, rarely oblique, setaceous- to ciliate-serrulate along margins, 15-23 cm. long, 6-10.5 cm. wide, chartaceous to subcoriaceous, in dry state grayish maroon-brown and scabrous above, light olive-brown beneath, secondary veins 15-24 pairs, tertiary veins elevated, more prominent than lesser venation, abundantly to sparingly setose to hirsute pubescent along and between veins above and beneath (trichomes denser and longer along major veins, but branched trichome types absent over both surfaces); petioles 1-3 cm. long, 2-3 mm. in diameter, half-terete, densely setose to hirsute pubescent. Inflorescences crowded near tip of branchlets, spreading, somewhat straight, lax, 20-80-flowered, 10-19 cm. long, 7-11 cm. wide, pubescence similar to that on leaves, primary peduncle 7-9 cm. long, bracts linear-triangular, often outcurved to revolute, to 20 mm. long. Flowers ca. 15 mm. broad, buds to 8 mm. in diameter, pedicels 10-15 mm. long, bracteoles triangular, to 4 mm. wide, sepals 5(-7), exposed parts in bud densely pubescent, trichomes of setose mixed with minute stellate types, imbricated parts pulverulent and stellate pubescent, all densely stellate pubescent inside, marginally to submarginally ciliolate; petals 5(-7), white, oblong, obtuse to rounded, 5-6 mm. long, 3-4 mm. wide; stamens 30-40, filament 3 mm. long, anther 2.5-3 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5(-7), 1 mm. long, stigmas simple. Berries not known.

Habitat.—Woods along canyon, at altitudes of 1,065-1,820 m.

Distribution.—Venezuela (States of Merida and Tachira).

Vernacular names.—*Guaco morado* (Merida: Steyermark).

Specimens examined.—VENEZUELA, MERIDA: Canagua River, near Canagua, between Mucuchachi and Canagua, May, fl., *Steyermark 56344* (F, VEN). TACHIRA: Headwaters of Quinimari River, below Cerro Las Copas, 20 km. S. of San Vicente de la Revancha, Jan., fl., *Steyermark 100952* (ECON, VEN).

S. meridensis appears to be closely allied to *S. isoxanthotricha*, particularly with respect to leaf pubescence. The former, however, has a non-caudate leaf apex and lax inflorescences with long-pedicelled flowers, in contrast to the caudate leaf apex and more compact inflorescences with short-pedicelled flowers of the latter.

The following field notes by Steyermark *(Steyermark 56344)* may be helpful in field identification: "Shrub 10 ft. tall; petals full white; leaves firmly membranaceous, dull olive-green and rugose above, pale green below; midrib below brownish at base; hairs brick red or rufous-buff."

Steyermark 100952 has rugulose upper leaf surface and somewhat lacunose lower leaf surface, as that in *Saurauia formosa,* but other characters fall within the range of variation of *S. meridensis.*

46. **Saurauia prainiana** Busc., Malpighia 25: 248, *pl. 6, fig. 10.* 1912.—Type: *Ule 6530* (K, lectotype; L, isolectotype; COL, GH, NY, photos).

Saurauia pastasana Diels, Biblioth. Bot. 116: 107. 1937.—Type: *Diels 1039* (n. v.), ex descr.

Saurauia sydowii Sleumer, Notizbl. 15: 374. 1941.—Type: *Sydow 891* (K, S).

Saurauia consimilis Sleumer, Notizbl. 15: 373. 1941.—Type: *Sydow 264* (K).

Shrubs to small trees to 10 m. tall, often bushy; copiously pubescent. Branchlets slender, terete, abundantly strigose to rarely setose pubescent; trichomes light to reddish brown, to 3(-5) mm. long. Leaves crowded behind tip of branchlets; blades obovate to elliptic-obovate, cuspidate at apex with acumen to 10 mm. long, setaceous-serrate to -serrulate along margins, setae rigid and sharp-pointed, 15.5-30 cm. long, 6.5-14 cm. wide, chartaceous, pale green above, grayish green beneath (in dry state dark brown to sooty above, light to dark olive-brown beneath), somewhat scabrous above, secondary veins 15-22 pairs, tertiary veins elevated, more prominent than lesser venation, sparingly setulose to strigillose pubescent along and between minor veins and abundantly strigose to appressed-setose (rarely setose) pubescent along major veins above, sparingly to abundantly setose pubescent along and between minor veins and abundantly strigose to appressed-setose or rarely setose pubescent along major veins (with stellate trichomes often present) beneath; petioles furrowed, 1.5-4 cm. long, 2-3 mm. in diameter, sparingly to abundantly strigose to appressed-setose pubescent. Inflorescences straight, (7-)15-40(-50)-flowered, 6.5-20(-30) cm. long, 2-6(-10) cm. wide, abundantly to densely strigose to setose pubescent, primary peduncle 2.5-8.5 cm. long, bracts subulate, to 10 mm. long. Flowers 12-17 mm. broad, buds to 5 mm. in diameter, pedicels 1-4 mm. long, bracteoles triangular, to 2.5 mm. long; sepals 5, pale green, suborbicular to broadly ovate to elliptic, 4-5 mm. long, 3-4.5 mm. wide, exposed parts in bud abundantly pubescent with trichomes of strigose to shaggy-strigose types, imbricated parts densely stellate pubescent, all densely stellate pubescent on upper portion and glabrous on lower half inside, marginally to submarginally ciliolate to ciliate; petals 5, white, oblong, rounded and slightly incised, 11-12 mm. long, 3.5-5.5 mm. wide; stamens 20-40, filament 3-3.5 mm. long, anther 2.5-3.5 mm. long; ovary 5-loculed, subglobose to ovoid, 5-sulcate, glabrous, styles 5, obsolete to 5 mm. long, stigmas 5, simple to capitate. Berries green, 5-loculed, globose, to 7 mm. across, 5-sulcate.

Habitat.—Rain forest, humid forest, fringe of forest, riverbank, road cut, at altitudes of 400-1,600(-2,500) m.

Distribution.—Ecuador (Provinces of Pichincha, Napo-Pastaza, Tungurahua, and Santiago-Zamora), Peru (Department of Loreto).

Specimens examined.—ECUADOR, PICHINCHA: Unido, Oct., fr., *Sydow 264* (K). NAPO-PASTAZA: Cerro Antisana, Shinguipino forest between Napo and Tena rivers, 8 km. SE. of Tena, Sept., fl., *Grubb et al. 1619* (K, NY); Canton Napo, overhanging Masaguali River, April, fl., *Mexia 7227* (UC, US); Pastaza River, May, fl. fr., *Rimbach 261* (F, MICH, NY, US); valley of Pastaza River, vic. of Mera and Shell Mera, Feb., fl. fr., *Rimbach 490* (S), fl., *Schultze-Rhonhof 2948* (K), Sept., fl. fr., *Soejarto & Hernandez 1343, 1345* (both in COL, ECON, GH, PASTO), *1344* (ECON, GH, PASTO), *1346, 1347, 1349* (all in ECON, GH), *1348* (GH); Puyo, Feb., fl., *Sydow 891* (K, S). TUNGURAHUA: Between Mapoto and Margaritas rivers, along old Canelos trail, March, fl., *Penland & Summers 184* (F, US); between Rio Verde and Rio Negro (on Baños to Puyo route), Sept., veg., *Soejarto & Hernandez 1350* (ECON, GH), *1351* (ECON, GH, PASTO).

PERU, LORETO: Pumayacu, between Balsapuerto and Mayobamba, Aug.-Sept., fl., *Klug 3176* (A, F, G, GH, K, NY, S, US); Cerro de Escaler, Nov., fl., *Ule 6530* (K, L; COL, GH, NY, photos).

VII. Ser. LANATAE Soejarto, ser. nov.

Strigosae Busc., Malpighia 25: 228. 1912, p. p. min.
Ruitzianae Busc., l. c.

Folia dense lanata vel velutina subtus, epidermes inferiores per pube occulti magnificatione inferior.

1. Inflorescences usually compact with densely aggregated and shortly pedicelled flowers, flowers less than 25 mm. broad, stamens usually less than 90.
   2. Trichomes along branchlets and petioles mostly straight and silky, flowers 15-25 mm. broad, stamens 45-90 ..... 47. *S. biserrata*
   2. Trichomes along branchlets and petioles curved, often coarse and prickly, flowers 20-25 mm. broad, stamens (25-)30-40(-50) ..... 48. *S. ursina*
1. Inflorescences rather loose and spreading, flower pedicels up to 18 mm. long, trichomes mostly long and flexuous, flowers (20-)25-40(-50) mm. broad, stamens 100-200 ..... 49. *S. bullosa*

47. **Saurauia biserrata** (R. & P.) Spreng., Syst. Veg. ed. 16, 4, Cur. Post. 2: 211. 1827; Macbr., Fl. Peru 3A(2): 679. 1956.—Based upon *Palaua biserrata* R. & P. Illustration: DC., Mém. Soc. Phys. Genève 1: *pl. 4.* 1822.

Palaua lanceolata R. & P., Syst. Veg. Fl. Peruv. Chilens. 181. 1798.—Type: *Ruiz & Pavon s. n.* (G: sheet annotated 662).

Palaua biserrata R. & P., l. c.—Type: *Pavon s. n.* (G, lectotype). [Note on sheet: *Palaua biserrata*—Peru; *Palava biserrata* R. & P.; *Apatelia biserrata* DC., Prodr. 1: 526.]

Palaua hirsuta R. & P. in Ruiz, Travels of Ruiz, Pavon and Dombey in Peru 78. 1940, nom. nud. [Note: Field Museum specimen no. 845498 is annotated as *Palaua hirsuta*.]

Apatelia lanceolata (R. & P.) DC., Mém. Soc. Phys. Genève 1: 427. 1822; Prodr. 1: 526. 1824.—Based upon *Palaua lanceolata* R. & P.

Apatelia lanceolata var. *peduncularis* DC., Mém. Soc. Phys. Genève 1: 427. 1822.—Type: *Pavon s. n.* (G: sheet annotated 192).

Apatelia biserrata (R. & P.) DC., Mém. Soc. Phys. Genève 1: 428. 1922; Prodr. 1: 526.—Based upon *Palaua biserrata* R. & P.

Saurauja lanceolata DC., Mém. Soc. Phys. Genéve 1: *pl. 4,* not the description on p. 421 (=*S. lanceolata,* Java).

Sauravia ruiziana Steud., Nomencl. Bot. ed. 2: 516. 1841, nom nud. (excl. syn. *S. lanceolata* DC., Java).

Saurauia ruiziana var. *weberbaueri* Busc., Malpighia 25: 442. 1913.—Type: *Weberbauer 2020* (COL, GH, NY, all photos).

Saurauia scabra Poepp. ex Choisy var. *prainiana* Busc., Malpighia 27: 493. 1916.—Type: *Ruiz & Pavon s. n.* (P) (Peru: Chinchao).

Saurauia pseudoruitziana Busc., Malpighia 30: 244. 1927.—Type: *Pearce s. n.* (K) (specimen purchased from South America).

Shrubs to small trees to 5 m. tall, erect, very rarely spreading; copiously pubescent. Branchlets terete, leaf scars prominent, pubescence sparse to dense, trichomes of sericeous type, to 8 mm. long, silky brown. Leaves crowded behind tip of branchlets; blades elliptic to obovate, acuminate at apex with acumen to 10 mm. long, narrowly cuneate to subrotundate at base, finely serrulate to setaceous-serrulate along margins, (9-)15-30(-33) cm. long, (4-)5-10(-13) cm. wide, coriaceous, dark green to brown above, brown to reddish brown beneath, scarcely scabrous above, secondary veins elevated, more prominent than lesser venation, sparingly sericeous to sericeous-strigose pubescent along veins above (pubescence denser along midrib), densely lanate with trichomes of sericeous to loriform (to 10 mm. long) mixed with stellate types along and between veins; petioles (1-)2-3.5(-4.5) cm. long, 3-5 mm. in diameter, densely sericeous pubescent. Inflorescences straight, (8-)10-40)(-75)-flowered, (6-)10-20(-35) cm. long, 1.5-5(-8) cm. wide, densely sericeous pubescent, primary peduncle (2-)6-10(-18) cm. long, bracts subulate to foliaceous, 8-30 mm. long. Flowers 15-25 mm. broad, densely aggregated, buds to 8 mm. in diameter, pedicels 1-8 mm. long, bracteoles linear to triangular, to 10 mm. long, sepals 5-6, 8-12 mm. long, 5-9 mm. wide, elliptic to suborbicular, acute to obtuse, exposed parts in bud densely sericeous pubescent, imbricated parts densely stellate pubescent, all densely stellate pubescent inside, marginally ciliolate to ciliate; petals 5-6, white, spatulate, rounded, 9-12 mm. long, 6-8 mm. wide; stamens 45-90(-150), filament 3.5-5 mm. long, anther 2.5-3 mm. long; ovary 5-6-loculed, ovoid, 5-6-sulcate, glabrous, styles 5-6, obsolete to 5 mm. long, stigmas simple to capitate. Berries 5-6-loculed, globose, 8-15 mm. across, 5(-6)-sulcate.

Habitat.—Cloud forest, humid mountain forest, dense forest, border of rain forest, evergreen subxerophytic bush-wood, shrubbery in open places, along riverbank, full exposure and semi-shade, at altitudes of 800-2,300 m.

Distribution.—Peru (Departments of Huanuco, Junin, and Ayacucho).

Specimens examined.—PERU, HUANUCO: Between Huanuco and Pampayacu, W. side of the Andean Mts., Jan., fl., *Kanehira 31* (A; F, fragment); Huacachi, vic. of Muña, May-June, fr., *Macbride 4181* (F, US); Huanuco, vic. of Carpish, Nov., fl., *Sandeman 3491* (K); above Chinchao, along road Huanuco to Tingo Maria, Aug., fl., *Soejarto & Wild 1424, 1426* (both in ECON, GH), Chicoplaya, fl., *Pavon s. n.*, fr., *Pavon s. n.* (both in G, with note: *Palaua lanceolata* sp. nov. de Chicoplaya. Fl. Peruv. sin lam. no. 11—by Pavon?); Cuchero, fl., *Pavon s. n.* (F); Muña, veg., *Ruiz & Pavon s. n.* (F, fragment; sheet no. 843573); Pillao, fl., *Ruiz & Pavon s. n.* (F), fr., *Ruiz & Pavon s. n.* (F). JUNIN: Tarma, vic. of Oreja Capelo, on road between Tarma and San Ramon, valley of Palca River, Jan., fl., *Hodge 6252A* (US: sheet no. 2056174); Utcuyacu, on road Palca to San Ramon, Jan., fr., *Hodge 6252B* (US: sheet no. 2268219); Pichis trail, between San Nicolas and Azupizu, July, fl., *Killip & Smith 26093* (F, NY, US); Chanchamayo Valley (Tarma), June, fl., *Constance & Tovar 2322* (US), Dec., fl., *Martinet 1272* (P), fl., *Raimondi 12493* (USM); Huacapistana, June, fl., *Killip & Smith 24203* (US), *24183* (F, NY, US), Oct., fl., *Sandeman 4563* (F, K), June, fl., *Sandeman s. n.* (K; sheet no. H2668/66-18); La Merced, Aug., fl., *Soukup 3369* (F, US); Tarma, *Weberbauer 2020* (COL, GH, NY, all photos); between Huacapistana and Palca, fl., *Weberbauer 2040* (G). AYACUCHO: Ayma, between Huanta and Apurimac river, May, fl. fr., *Killip & Smith 22768* (F, NY, US); Choimacota Valley, vic. of Quillomicto, Feb., fl., *Weberbauer 7545* (F, US). NO PRECISE LOCALITY: ? Junin, fl., *Dombey 952* (P: sheet numbered 87-34-66); South America (Peru?), fl. fr., *Pearce s. n.* (K: purchased April 1884); fl., *Poeppig 125* (G: annotated as *Saurauja ruiziana* Steud., *Apatelia lanceolata* DC. var. β. Icon; Choisy scripsit); fl., *Poeppig 1395* (BM, L); Andean shrubbery, June, fl., *Woytkowski 6346* (GH); fl. fr., *Pavon s. n.* (FI, G; GH-photo) (Annotation on G sheet: 1. Polyandr. 5-gyn.; *Palava lanceolata* R. & P., *Apatelia lanceolata* DC.; Perou, M. Pavon, 1827; 2. *Palaua lanceolata* ex Peru); fl., *Pavon s. n.* (P: sheet numbered 87-33-66); fl., *Pavon s. n.* (G: this has been selected as a lectotype of *P. biserrata* R. & P.); fl., *Pavon s. n.* (G) (sheet annotated:

Peruvia, herb. Pavon); fl., *Pavon s. n.* (G) (sheet annotated: 192 Gen Nov. ex *polyadelphiis* Perou, Pavon; *Apatelia lanceolata* β DC., scripsit APDC.); fl., *Pavon s. n.* (G: sheet annotated 11); veg., *Pavon s. n.* (F: fragment, sheet numbered 695109); fr., *Pavon s. n.* (F: fragment, sheet numbered 686267); fl., *Ruiz & Pavon s. n.* (F; sheet numbered 844793); veg., *Ruiz & Pavon s. n.* (F: sheet number 844821); fr., *Ruiz & Pavon s. n.* (F: sheet numbered 845498, annotated as *Palaua hirsuta, P. lanceolata*); fl., *Ruiz & Pavon s. n.* (G; NY, photo) (G sheet is annotated as *Palaua lanceolata* sp. n.—by Ruiz & Pavon?—and *Palava lanceolata* R. & P., *Apatelia lanceolata* α DC., scripsit APDC; this specimen is designated as lectotype of *Palaua lanceolata* R. & P.); fl., *Ruiz & Pavon s. n.* (F: no. 845432); fr., *Pavon s. n.* (K).

The materials collected and, presumably, examined by Ruiz & Pavon, and later examined by De Candolle and Buscalioni, made it possible to clarify the correct taxonomy and nomenclature of this species. Because no types were ever mentioned by Ruiz & Pavon or by later authors, it has become necessary to select lectotypes from these specimens. In the process, the most useful clues were handwritten annotations by Ruiz & Pavon (as *Palaua,* instead of *Palava*), by De Candolle, and by Buscalioni. Since most of these specimens do not bear collector's or any sequential number, any other identifying number and/or annotation found on the herbarium sheet has been indicated in citing the botanical institution, for the sake of clarity.

Taxonomically, *S. biserrata* is characterized by the dense sericeous pubescence, by the often aggregated flowers on the inflorescences, and by the moderate to high number of stamens. Young leaves are often reddish to purplish red.

48. **Saurauia ursina** Tr. & Pl., Ann. Sci. Nat. ser. 4, 18: 265. 1862; Prodr. Fl. Nov. Granat. 1: 262. 1862.—Type: *Triana s. n.* (K, lectotype; G, P, iso-lectotypes; F, fragment of leaf; COL, US, photos). Figure 32.

Saurauia ursina fma. *strigosa* Busc., Malpighia 25: 417. 1913.—Type: *Jervisé s. n.* (K).

Saurauia ursina fma. *veranii* Busc., l. c. 418. 1913.—Type not indicated ex descr.

Saurauia ruitziana auct. (non Steud.), l. c. 425. 1913, p. p.

Small trees to 7 m. tall, trunk straight to crooked, crown open; copiously pubescent. Branchlets slender, terete to subangular, densely pubescent, trichomes coarse to prickly, of paleaceous to rarely sericeous types, light to dark reddish brown in color, to 6 mm. long, curved towards apex of branchlet, thickened to flattened at base and turning

very slender and pointed or bent at apex. Leaves crowded to rarely clustered behind tip of branchlets; blades elliptic to elongate-obovate, acuminate at apex with acumen to 15 mm. long, cuneate to rarely obtuse or oblique at base, serrulate to setaceous-serrulate along margins, (7-)10-25(-35) cm. long, (3.5-)4.5-10(-13.5) cm. wide, coriaceous to strongly coriaceous, dark greenish brown to maroon above, gray-brown to deep reddish brown beneath, moderately scabrous above, secondary veins (16-)20-25(-29) pairs, tertiary veins elevated, more prominent than lesser venation, abundantly to sparingly setose to hirsute pubescent along and between veins above, densely velutinous pubescent with trichomes of loriform frequently mixed with stellate to dendroid types beneath, petioles (0.75-)2-4.5(-6) cm. long, 2-4.5 mm. in diameter, densely hirsute to prickly-hirsute pubescent. Inflorescences straight to ascending, (7-)15-30(-60)-flowered, (3.5-)6-12(-15) cm. long, 1.5-6 cm. wide, densely hirsute to prickly-hirsute pubescent (particularly along peduncle), primary peduncle (1.5-)-5 cm. long, bracts subulate to triangular, to 10 mm. long, very rarely foliaceous, to 25 mm. long. Flowers often aggregated on inflorescence, 20-25 mm. broad, buds to 7 mm. in diameter, pedicels 0.5-3 mm. long (to 10 mm. in fruiting stage), bracteoles triangular, to 3 mm. long; sepals 5, suborbicular-ovate to elliptic, obtuse to acute, 7-9 mm. long, 5-7 mm. wide, exposed parts in bud densely pubescent with trichomes of sericeous to hirsute types, imbricated parts densely stellate pubescent, all densely stellate pubescent inside, marginally ciliolate; petals 5, white, oblong to obovate-oblong, obtuse to incised, 10-12 mm. long, 4.5 mm. wide; stamens (25-)30-45(-50), filament 4-5 mm. long, anther 3.5-4 mm. long; ovary 5-loculed, globose, 5-sulcate, glabrous, styles 5, obsolete to 5(-6) mm. long, stigmas simple to capitate. Berries green, 5-loculed, globose, to 10 mm. across, 5-sulcate.

Habitat.—Humid mountain forest, open forest, woodland border, scrub forest, subparamo, secondary forest, riverbank, creek, open areas, gardens, at altitudes of 1,500-2,600 m.

Distribution.—Colombia (Departments of Antioquia, Santander and Cundinamarca).

Vernacular names.—*Dulumoco, Guasco* (widely used names in Antioquia).

Specimens examined.—COLOMBIA, ANTIOQUIA: Guadalupe, Nov., fl., *Daniel 2622* (MEDEL, US); El Peñol, Aug., fr., *Daniel 405* (US); Guarne, Piedras Blancas and vic., July fl., *Cabrera 154* (MEDEL), March, fr., *Espinal 418* (MEDEL), Aug., fl. fr., *Espinal 1237* (MEDEL), Sept., fl. fr., *Soejarto 2104, 2111* (UNIV. OF ANTIOQUIA), Aug., fl., *Soejarto 4239, 4242, 4244, 4246, 4252, 4253* (all in UNIV. OF ANTIOQUIA), fr., *4243, 4247* (both in UNIV. OF ANTIOQUIA); Valle de Aburra, vic. of Medellin, Dec., fl., *Archer 1089* (MEDEL, NY, US), Oct., fl., *Domingo-Peñazos 3820* (MEDEL, US), Oct., fl., *Molina 34* (MEDEL, US), fl., *Soejarto & Rivera 2053* (ECON, GH, MEDEL), Oct., fr., *Torres 313* (MEDEL); Sta. Helena, above Medellin on road to Rionegro, June, fl., *Soejarto 4531* (UNIV. OF ANTIOQUIA); Las Palmitas, fl., *Barkley et al. 22* (US); road

Boqueron to San Cristobal, June, fl., *Barkley & Correa* 93 (US), Oct., fl., *Hodge 6599* (MEDEL), May, fl., *Hodge 6856* (MEDEL); road Caldas to Primavera, Oct., fr., *Ruiz s. n.* (MEDEL); Alto de Boqueron, Sept., fl., *Toro 30* (MEDEL); Rionegro, fl., *Jervisé s. n.* (K), Dec., fl., *no collector 309* (MEDEL); La Ceja and vic., Dec., fl., *Daniel 2170* (MEDEL, US), June, fl., *Soejarto & Rivera 2040* (ECON, GH, MEDEL); Pozo Rico, June, fl., *Soejarto & Rivera 2051* (ECON, GH, MEDEL); vic. of El Retiro, fl. fr., *Uribe-Uribe 4346* (COL, ECON); vic. of Hoyo Rico, Sept., fl., *Valbuena & Barkley 18A213* (NY, US); Angelopolis, Nov., fl., *Barkley & Gutierrez 1681* (MEDEL); Tamesis, Feb., fr., *Toro 956* (MEDEL, NY); Fredonia, June, fl., Toro 1039 (MEDEL, NY); Salto de Buey, Jan., fl., *Daniel s. n.* (MEDEL); Sonson and vic., May, fl., *Core 745* (US), Aug., fl., *Johnson & Barkley 18C846* (MEDEL, US), June, fl., *Rivera 315* (MEDEL), fl., *Rivera 316* (MEDEL), March, fl. fr., *Scolnik et al. 19An306* (BM, US), June, fl., *Soejarto & Rivera 2043* (ECON, GH, MEDEL); no loc., April, fl., *Triana 3251* (K); Rio Negro, fl., *Triana s. n.* (F, leaf fragment; G, K, P; COL, US, photos). SANTANDER: E. of Bucaramanga, Dec., fl., *Molina & Barkley 18S342* (US). CUNDINAMARCA: Chiquinquira, July, fl., *Felix s. n.* (L); road Bogota to Honda, Guadua, Aug., fl., *Garcia-Barriga 16103* (COL, ECON); Bogota, Quebrada del Chico, April, fl., *Schneider 156* (S); Fusagasuga, July, fl., *Soejarto & Schultes 216* (COL, ECON, GH), 218A (COL, ECON, GH); Junin to Gama, Rio Sucio, Sept., fl., *Garcia-Barriga 17534* (COL, ECON); Gacheta to Ubala, Laguna Verde, July, fl., *Garcia-Barriga 17487* (COL, ECON). NO PRECISE LOCALITY: Alto de Lasca, May, fl., *Goudot s. n.* (P; US, photo); Aug., fl., *Tomas 218* (MEDEL).

The region of Antioquia appears to be the center of distribution of *S. ursina,* where it is abundantly represented in the mountains surrounding the city of Medellin. This species is distinguished in the field by the following characteristics: (1) dense and reddish maroon pubescence on the leaves and shoots; (2) coarse, curved, and long trichomes, which are sometimes prickly, along the branchlets and petioles; (3) aggregated flowers on the inflorescence; and (4) the low number of stamens.

49. **Saurauia bullosa** Wawra in von Mart., Fl. Brasil. 12(1): 286. *pl. 56, fig. 1.* 1886.—Type: ex descr., ex icon.

Saurauia pseudoexcelsa Busc., Malpighia 25: 236. 1912, p. p.

Saurauia spragueana Busc., Malpighia 26: 10. *pl. 4, fig. 4.* 1913.—Type: *Sodiro 154 (A187?)* (COL, NY, photos).

Saurauia leoi Busc., Malpighia 30: 121. *pl. 3, fig. 3.* 1927.—Type: *Karsten s. n.* (n. v.), ex descr, ex icon.

Saurauia hypomalla R. Benoist, Bull. Soc. Bot. France 80: 334. 1933.—Type: *Rivet 184* (P).

Saurauia mojandensis R. Benoist, l. c.—Type: *Benoist 4001* (P).

Saurauia garcia-barrigae R. E. Schultes, Mutisia 3: 1. *figs. 1-6.* 1952.—Type: *Garcia-Barriga 12276* (COL, holotype; F, GH, US, isotypes).

Saurauia roseotincta R. E. Schultes, Bot. Mus. Leafl. 16: 83. 1953.—Type: *Macbride 3652* (US, holotype; F, isotype).

Trees to 10(-20) m. tall, diameter to 20(-40) cm. at base, bark irregularly cracked, corky, gray-brown, wood white to light brown, brittle, trunk straight to crooked, frequently with branches inserted in a wheel-like pattern, crown open; copiously pubescent. Branchlets stout, terete, densely hirsute pubescent or wooly, trichomes slender, slightly flexuous, gradually swollen or flattened towards their base, golden-yellow to -brown to deep reddish brown, to 12 mm. long. Leaves crowded behind tip of branchlets; blades elliptic to elongate-obovate, acute to acuminate at apex with acumen to 15 mm. long, cuneate to obtuse to subcordate and frequently oblique at base, serrulate to setaceous-serrulate along margins, 15-30(-38) cm. long, (3-)6-12(-16) cm. wide, coriaceous, dark green above, hoary to grayish to rusty-brown beneath, rugose to rugulose and scabrous to strongly scabrous above, soft and wooly to touch beneath, secondary veins (15-)20-27(-32) pairs, tertiary veins elevated, more prominent than lesser venation, abundantly setose to strigose pubescent along and between veins above, densely lanate pubescent with trichomes of loriform and flexuous mixed with stellate (between veins) and curved paleaceous types (along veins) beneath; petioles 2-4.5(-6) cm. long, 3-4.5 mm. in diameter, pubescence similar to that along branchlets. Inflorescences erect to ascending, 9-40(-60)-flowered, 15-33 cm. long, 7-12 cm. wide, pubescence similar in type and density to that along branchlets and petioles, primary peduncle 7-17 cm. long, bracts linear to subulate, to 15 mm. long. Flowers (20-)25-40(-50) mm. broad, buds to 15 mm. in diameter, pedicels 3-10(-18) mm. long, bracteoles triangular to 5 mm. long; sepals 5, mostly pale green, ovate to oblong to obovate, subacute to obtuse, 10-18 mm. long, 6-11 mm. wide, exposed parts in bud densely pubescent with trichomes of hirsute to shaggy-strigose mixed with minutely stellate to tufted types, imbricated parts densely stellate pubescent, all densely stellate pubescent inside, marginally ciliate; petals 5, broadly oblong to elliptic, obtuse to incised, 10-22 mm. long, 8-15 mm. wide; stamens (70-)100-200(-240), filament 3-5 mm. long, anther 2-2.5 mm. long; ovary 5(-6)-loculed, globose, 5(-6)-sulcate, glabrous, styles 5(-6), obsolete to 7 mm. long, stigmas simple to capitate. Berries green, ovoid, to 20 mm. across, 5-sulcate.

Habitat.—Wet mountain forest, cloud forest, subparamo, bushy forest, moist *Cinchona* forest, *Podocarpus* forest, slopes with secondary forest, rolling hills, wet ravines and gullies, along stream, grassy slopes, cultivated potato fields, gardens, at altitudes of (1,500-)2,700-3,600 m.

Distribution.—Colombia (Departments of Santander, Caldas, Quindio, Tolima, Valle, Cauca, Huila, Nariño, Putumayo), Ecuador (Provinces of Carchi, Imbabura, Pichincha, Santiago-Zamora, Loja), Peru (Departments of Lambayeque and Huanuco).

Vernacular names.—*Dulumoco* (Valle: Cuatrecasas), *Moquillo* (Nariño: Soejarto; Carchi: Mexia), *Pururuju* (Santiago-Zamora: Solis).

Specimens examined.—COLOMBIA, SANTANDER: Quebrada de Paris, N. of La Baja, Jan., fl., *Killip & Smith 18825* (A, GH, NY, US). CALDAS: basin of Otun River, above Peñas Blancas, Nov., fl., *Cuatrecasas 23316* (ECON, F); Salento, Rio Boquia, July, fl., *Killip & Hazen 8845* (GH, NY, US); between Manizales and Nevado del Ruiz, June, fl., *Soejarto 2032* (ECON, GH). QUINDIO: no. loc., Jan., fl., *Holton 23* (NY); El Roble, near Cartago, Nov., fl., *Holton 24 (=792)* (K, NY). TOLIMA: El Libano to Murillo (km. 11 to 12), Alto de Peñones, July, fl., *Garcia-Barriga 12276* (COL, F, GH, US). VALLE: Cordillera Central, headwaters of Tulua River, Quebrada de Las Vegas, March, fl., *Cuatrecasas 20414* (ECON, F); basin of Bugalagrande River, Cuchilla de Barragan, between Las Azules and Las Violetas, April, fl. fr., *Cuatrecasas 20805* (ECON, F), fl., *20997* (ECON, F, US); Cordillera Occidental, Quebrada Las Nieves, below El Diamante, July, fl. fr., *Cuatrecasas 21804* (ECON, F); basin of Amayme River, La Albania, Feb., fr., *Cuatrecasas et al. 26809* (US). CAUCA: road Popayan to Totoro, Alto de Angosi, 11 km. from Totoro, July, fl., *Garcia-Barriga 12721* (US); Paletara to Calaguala, June, fl., *Pennell 7097* (US); Tierra Dentro, Las Escaleretas, Moras Valley along Paez River basin, Feb., fl., *Pittier 1371* (US). HUILA: Balsillas River, Aug., fl., *Rusby & Pennell 713* (NY, US). NARIÑO: Tuquerres, below El Espino, Aug., fl., *Soejarto 1472* (ECON, GH); Chachagui, E. of Pasto River, 18 km. N. of Pasto, Oct., fl., *Fosberg 21254* (NY, US); Pasto, volcano El Galeras, fl., *Castro 78* (ECON, PASTO), July, fl., *Soejarto & Hernandez 1015, 1045* (both in COL, ECON, GH, PASTO); Alto de Tangua, road to Yacuanquer, July, fl., *Uribe-Uribe 5278, 5328* (both in COL, ECON); Sapués, vic. of El Espino, Aug., fl., *Soejarto et al. 1334, 1435* (both in ECON, GH); Guachucal, road Guachucal to Aldana, Aug., fl., *Soejarto et al. 1335* (ECON, GH, PASTO); road El Encano to Pasto, Paramo del Tabano, Jan., fl., *Cuatrecasas 11966* (US); Lake La Cocha, Corota island, July, fl., *Garcia-Barriga et al. 13044* (MEDEL, US); Bosque Botana, above Instituto Tecnologico Agricola Exptl. Station, April, fl., *Fajardo 81* (ECON, PASTO), fl. fr. veg., *Soejarto & Porter 495, 496,*

500 (all in ECON, GH), *Soejarto 1473, 1474, 1475, 1478, 1479, 1480, 1483, 1484, 1491, 1494, 1496, 1504, 1508, 1595, 1596* (all in ECON, GH).

ECUADOR, CARCHI: Tulcan, valley of Pun, Aug., fl., *Mexia 7599* (F, UC, US); 12 km. from Tulcan in the direction of Juliandrade, Aug., fr., *Soejarto et al. 1336* (ECON, GH, PASTO). IMBABURA: Shanshipamba, Nov., fr., *Solis 14178* (F). PICHINCHA: Cordillera de Pichincha, N. of Quito, Machinqui to Pomasqui, Aug., fl., *Hitchcock 20888* (GH, NY, US); Nono, upper reaches of Nanegal River (tributary of Guayllabamba River), fl., *Sodiro 154* (COL, NY, photos). SANTIAGO-ZAMORA: Cordillera Oriental, Campanas to the east of El Pan, July, fl., *Solis 5043* (F), July, fr., *Steyermark 53542* (NY). LOJA: Villenaco, Oct., fl., *Espinosa E-713* (F, NY); between Loja and San Lucas, Sept., fl., *Hitchcock 21458* (NY, US); San Lucas to Ona, Sept., fr., *Hitchcock 21513* (NY, US); vic. of Loja, July, fl., *Penland & Summers 1136* (F, US), Nov., fl., *André 4413* (F, K, NY, US). NO PRECISE LOCALITY: vic. of Zaragura, Sept., fl., *Rose et al. 23165* (GH, NY, US); E. of Mojanda, fl., *Sodiro s. n.* (P).

PERU, LAMBAYEQUE: Chiclayo, Oct., fl., *Ranh P-2199* (F), HUANUCO: Chaglla, May, fl., *Macbride 3652* (F, US); upper region of Huallaga River, Pampayacu, July, fl., *Sawada 53* (F); Pillao, March, fl., *Woytkowski 34178* (F, US); between Huanuco and Tingo Maria, Chinchao, July, fl. veg., *Soejarto & Wild 1421, 1422, 1428, 1429* (all in ECON, GH). NO PRECISE LOCALITY: fl., *Martinet 1640* (P).

S. bullosa is abundantly represented in the Nariño mountain system at altitudes above 2,700 m. At the volcano El Galeras, above Pasto, individuals of this species are found up to 3,600 m., probably the highest limit of tolerance of members of *Saurauia*. Young leaves and shoots are often deep purplish red in color, but they turn somewhat gray or whitish gray when old. Other distinguishing characters of this species are (1) leaves densely lanate pubescent beneath, with trichomes of loriform to paleaceous mixed with stellate types; (2) flowers large (up to 50 mm. broad); (3) stamens high (over 100) in number. The heterotrichous nature of the lower leaf indument, however, can only be seen clearly by selective focusing using no less than 10 times magnification.

Although members of this species are often found in disturbed habitats, such as secondary forest, abandoned fields, and gardens, the original habitat appears to be humid or wet mountain forest, as

that still found on the Corota Island in the middle of Lake La Cocha, in Nariño. The center of distribution of the species appears to be located in the Colombo-Ecuadorian frontier.

IMPERFECTLY KNOWN TAXA

1. *Saurauia raimondiana* Sleumer, Notizbl. 12: 145. 1934.—Type: *Raimondi 4758* (not seen).

Saurauia raimondiana var. *caxamarcensis* Sleumer, l. c. 146.—Type: *Raimondi 5394* (not seen).

2. *Saurauia rhodosma* Sleumer, l. c. 147.—Type: *Schultze 1141* (not seen).

3. *Saurauia trolliana* Sleumer, l. c. 148.—Type: *Troll 1518* (not seen). From the original specific description, it appears that this species is closely related to *S. rusbyi* Britt.

4. *Saurauia schultzeorum* Sleumer, Notizbl. 15: 374. 1941.—Type: *Schultze-Rhonhof 3058* (not seen).

ADDENDA

42. **Saurauia excelsa** Willd.

Saurauja xanthotricha Turcz., Bull. Soc. Imper. Naturalistes Moscou 31(1): 243. 1858; Knuth, Init. Fl. Venez. 479 — Type: *Funck & Schlim 106* (BM, F, K, P).

Saurauja pycnotricha Turcz., l.c. 244; Busc., Malpighia 25: 240. 1912; Knuth, l.c.; Schultes, Caldasia 3: 253. 1943. — Type: *Funck 306* (G, P).

Saurauja spectabilis auct., non Hook.: Turcz., l.c.

Saurauja peduncularis auct., non Tr. & Pl.: Ernst, Expos. Nac. Venez. 1883. 217. 1884; Pittier, Pl. Usu. Venez. 300. 1926; Knuth, l.c.

FIG. 3. *Saurauia spinuligera* R. E. Schultes, *Toro 983* (NY), collected in Tamesis of Antioquia (Colombia).

FIG. 4. *Saurauia stapfiana* Busc., *Triana 267* (P), a type specimen, collected in Mariquita of Tolima (Colombia).

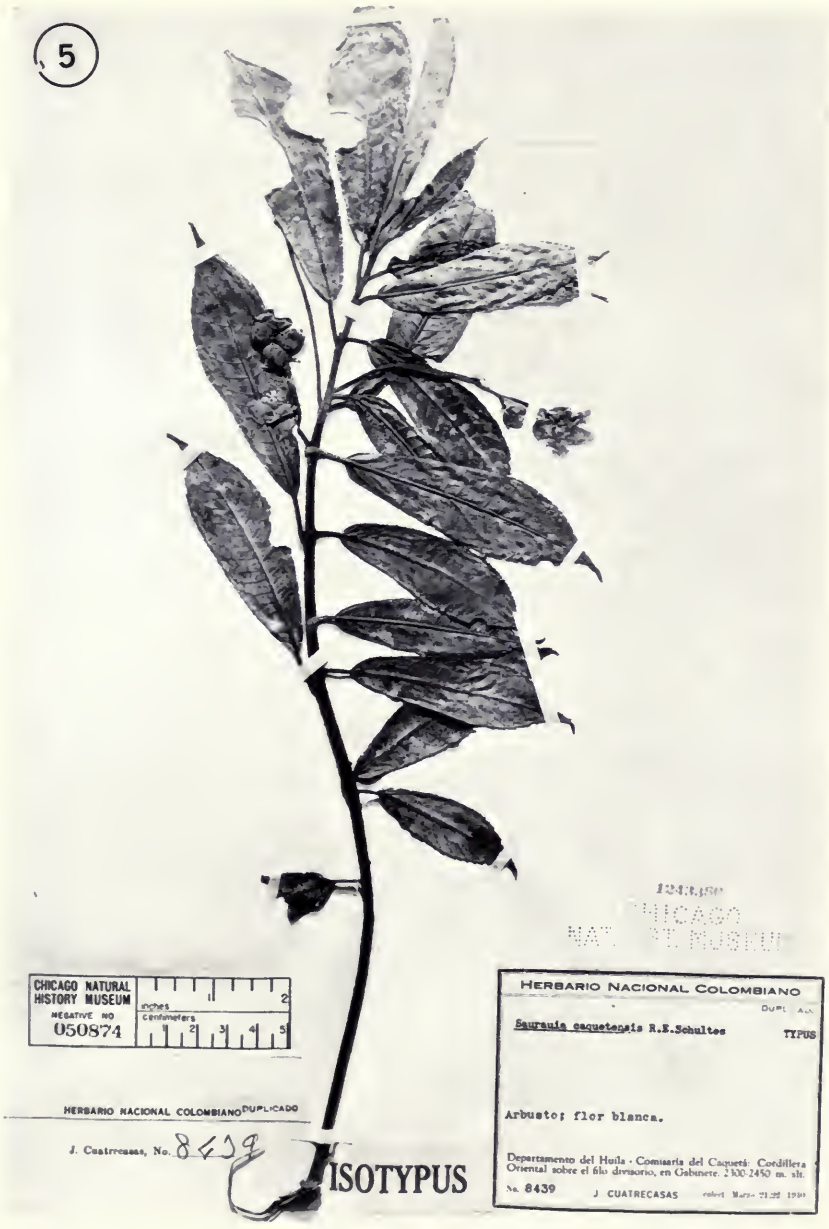

FIG. 5. *Saurauia caquetensis* R. E. Schultes var. *caquetensis, Cuatrecasas 8439* (F), a type specimen.

FIG. 6. *Saurauia rusbyi* Britt., *Rusby 482* (MICH), a type specimen.

FIG. 7. *Saurauia aequatoriensis* Sprague, *Spruce 4989* (G), a type specimen.

FIG. 8. *Saurauia glabra* (R. & P.) Soejarto, *Pavon s.n.* (G), a lectotype of *Palaua glabra* R. & P.

FIG. 9. *Saurauia adenodonta* Sleumer, *Schultze-Rhonhof 2914* (K), a lectotype.

FIG. 10. *Saurauia laevigata* Tr. & Pl., *Triana s.n.* (G), a lectotype, collected in Mariquita of Tolima (Colombia).

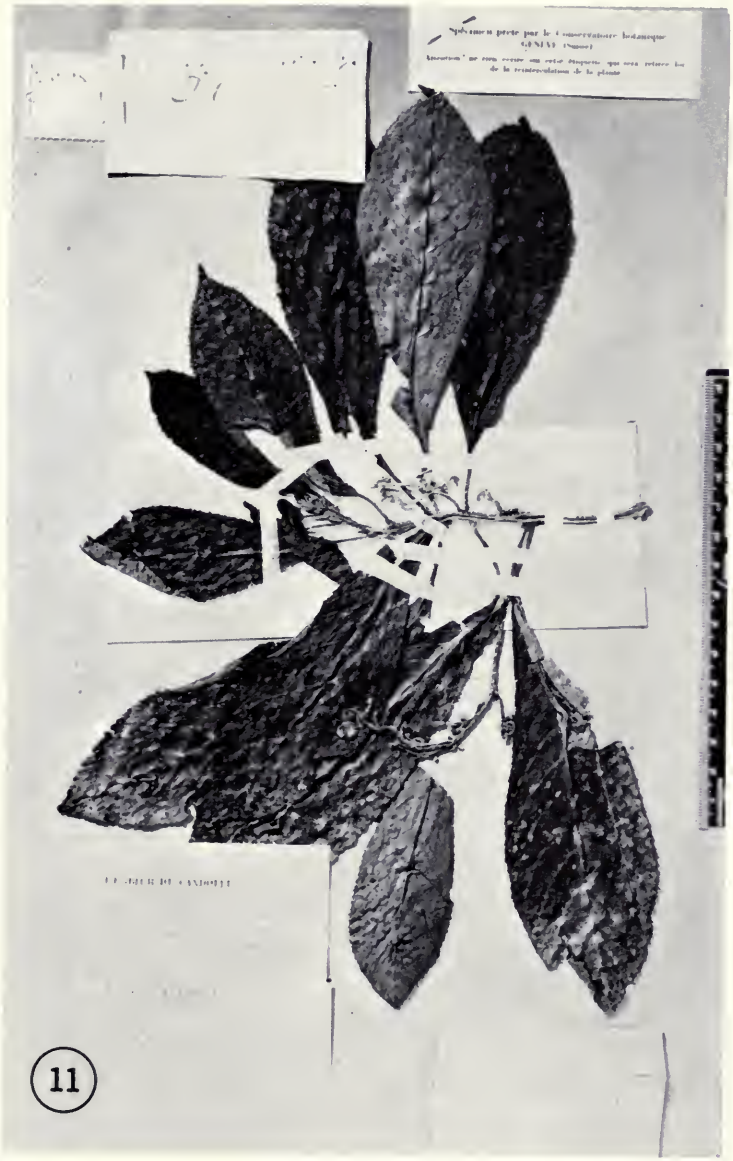

FIG. 11. *Saurauia strigillosa* Tr. & Pl., *Triana s.n.* (G), a lectotype, collected in Mariquita of Tolima (Colombia).

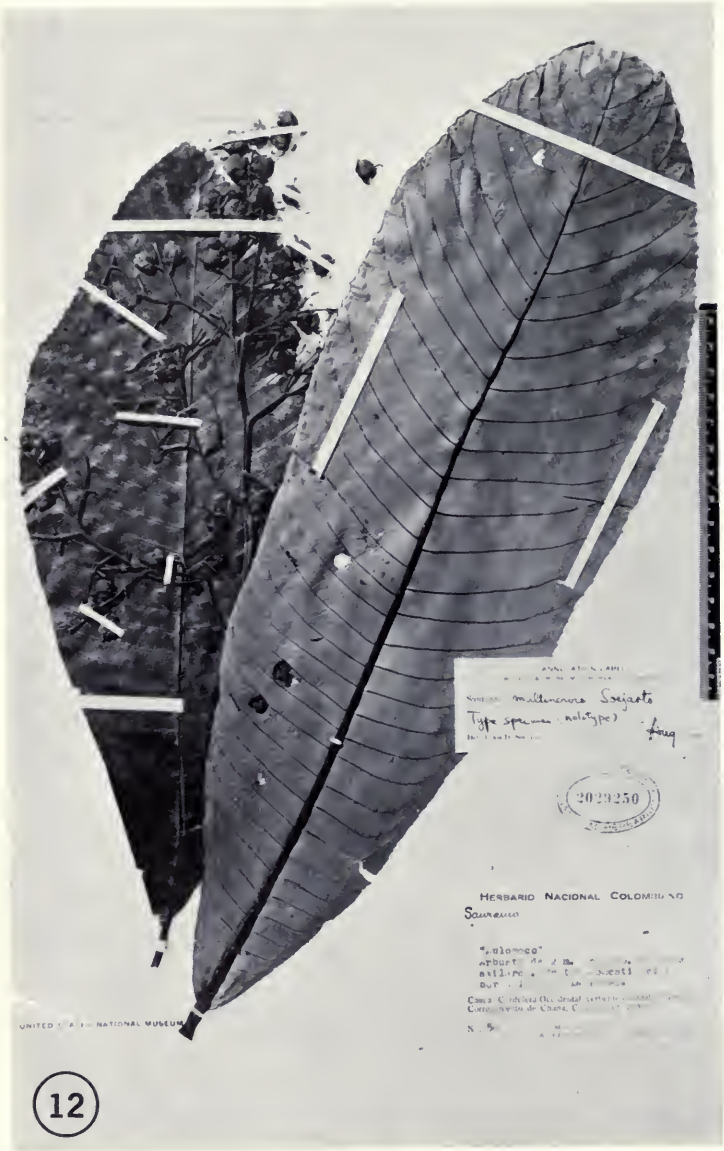

FIG. 12. *Saurauia multinervis* Soejarto, *Idrobo & Fernandez 54* (US), a holotype.

FIG. 13. *Sauraula schultesiana* Soejarto, *Pennell 10501* (NY), a holotype.

FIG. 14. *Saurauia solitaria* Sleumer, *Weberbauer 7067* (F), a lectotype.

FIG. 15. *Saurauia micayensis* Killip, *Killip 7932* (US), a lectotype.

FIG. 16. *Saurauia natalicia* Sleumer, *Weberbauer 7867* (F), a lectotype.

FIG. 17. *Saurauia pulchra* Sprague, *Sprague 323* (K), a lectotype.

FIG. 18. *Saurauia floccifera* Tr. & Pl., *Triana s.n.* (P), an iso-lectotype.

FIG. 19. *Saurauia cuatrecasana* R. E. Schultes, *Cuatrecasas 9209* (F), an isotype.

FIG. 20. *Saurauia arnoldi* Sleumer, *Kernan 125* (NY), a neotype, collected in San Lorenzo Mountains of Magdalena (Colombia).

FIG. 21. *Saurauia mexiae* Killip ex Soejarto, *Mexia 8488* (US), a holotype.

FIG. 22. *Saurauia tomentosa* (HBK.) Spreng., *Bonpland 3206* (P), a lectotype.

FIG. 23. *Saurauia formosa* Sleumer, *Weberbauer 6637* (US), an iso-lectotype.

FIG. 24. *Saurauia chaparensis* Soejarto, *Steinbach 8920* (GH), a holotype.

FIG. 25. *Saurauia pedunculatis* Tr. & Pl., *Soejarto 938*, collected in an area west of Tuquerres of Nariño (Colombia), the same general area where the type was collected.

FIG. 26. *Saurauia lehmannii* Hieron., *Lehmann 6675* (F), an iso-lectotype.

FIG. 27. *Saurauia scabra* (HBK.) Dietr., *Soejarto & Idrobo 913,* collected in the Salto of Tequendama area (Cundinamarca, Colombia).

FIG. 28. *Sauraúia tambensis* Killip, *Hitchcock 21281* (US), a holotype.

FIG. 29. *Saurauia excelsa* Willd., *Bredemeyer s.n.* (type specimen), formerly deposited at the Berlin Herbarium.

FIG. 30. *Saurauia brachybotrys* Turcz., *Linden 972* (K), a type specimen.

FIG. 31. *Saurauia meridensis* Steyermark, *Steyermark 56344* (F), a holotype.

FIG. 32. *Saurauia ursina* Tr. & Pl., *Triana s.n.* (P), an iso-lectotype, collected in Rio Negro of Antioquia (Colombia).

APPENDIX
LIST OF ACCEPTED SERIES AND SPECIES OF SOUTH AMERICAN *SAURAUIA*

Arabic numerals in front of the Latin binomial refer to the species number used in the present revision.

I. Ser. **Omichlophilae** Soejarto
1. *S. spinuligera* R. E. Schultes
2. *S. stapfiana* Busc.
3. *S. omichlophila* R. E. Schultes
4. *S. caquetensis* R. E. Schultes

II. Ser. **Gynotrichae** Busc.
5. *S. loeseneriana* Busc.

III. Ser. **Laevigatae** Busc.
6. *S. briqueti* Busc.
7. *S. portachuelensis* R. E. Schultes
8. *S. rusbyi* Britt.
9. *S. glabra* (R. & P.) Soejarto
10. *S. yasicae* Loes.
11. *S. aequatoriensis* Sprague
12. *S. adenodonta* Sleumer
13. *S. strigillosa* Tr. & Pl.
14. *S. laevigata* Tr. & Pl.

IV. Ser. **Parviflorae** Soejarto
15. *S. multinervis* Soejarto
16. *S. schultesiana* Soejarto
17. *S. peruviana* Busc.
18. *S. chiliantha* R. E. Schultes
19. *S. solitaria* Sleumer
20. *S. micayensis* Killip
21. *S. natalicia* Sleumer
22. *S. parviflora* Tr. & Pl.
23. *S. pseudoleucocarpa* Busc.
24. *S. spectabilis* Hook.

V. Ser. **Pulverulentae** Busc.
25. *S. pulchra* Sprague
26. *S. aromatica* R. E. Schultes
27. *S. floccifera* Tr. & Pl.
28. *S. choriophylla* R. E. Schultes
29. *S. cuatrecasana* R. E. Schultes
30. *S. arnoldi* Sleumer
31. *S. tomentosa* (HBK.) Spreng.
32. *S. pseudostrigillosa* Busc.
33. *S. mexiae* Killip ex Soejarto

VI. Ser. **Macrophyllae** Busc.
34. *S. formosa* Sleumer
35. *S. chaparensis* Soejarto
36. *S. peduncularis* Tr. & Pl.
37. *S. putumayonis* R. E. Schultes
38. *S. herthae* Sleumer
39. *S. lehmannii* Hieron.
40. *S. scabra* (HBK.) Dietr.
41. *S. tambensis* Killip
42. *S. excelsa* Willd.
43. *S. brachybotrys* Turcz.
44. *S. isoxanthotricha* Busc.
45. *S. meridensis* Steyerm.
46. *S. prainiana* Busc.

VII. Ser. **Lanatae** Soejarto
47. *S. biserrata* (R. & P.) Spreng.
48. *S. ursina* Tr. & Pl.
49. *S. bullosa* Wawra

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INDEX TO LATIN NAMES

New names and combinations are in boldface type, synonyms in *italics*, and all other names in regular Roman type. Names with (*) are mentioned incidentally, with (**) imperfectly known taxa, and with (†) fossil representatives. Page numbers in boldface type indicate descriptions, in *italics* plates/illustrations, in parentheses taxonomic keys, and in regular type all others.